PB-230 422

POLLUTION OF THE INTERSTATE WATERS OF THE CHATTAHOOCHEE RIVER AND ITS TRIBUTARIES, FROM ATLANTA, GEORGIA TO FORT GAINES, GEORGIA. PROCEEDINGS OF CONFERENCE HELD AT ATLANTA, GEORGIA ON JULY 14-15, 1966. VOLUME I

Federal Water Pollution Control Administration
Washington, D. C.

15 July 1966

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PROCEEDINGS

VOLUME 1

ATLANTA
ALABAMA
Chattahoochee River
GEORGIA

Atlanta - July 14-15, 1966

Conference

In the matter of Pollution of the Interstate Waters of the Chattahoochee River and its Tributaries, from Atlanta, Georgia to Fort Gaines, Georgia

UNITED STATES
DEPARTMENT OF THE INTERIOR
Federal Water Pollution
Control Administration

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FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

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In re:

ENFORCEMENT CONFERENCE
ON POLLUTION OF THE
CHATTAHOOCHEE RIVER

- - - - - - - - - - - - - - - - x

Grand Ballroom
Americana Motor Hotel
Atlanta, Ga.
Thursday, July 14, 1966

Conference in the above-entitled matter was convened, pursuant to notice, at 9:45 a.m.

MURRAY STEIN, Chairman

CONFEREES:

IRA L. MYERS, M. D., Chairman, Alabama Water Improvement Commission

J. L. CROCKETT, JR., Director, Technical Staff, Alabama Water Improvement Commission

R. S. HOWARD, JR., Executive Secretary, Georgia Water Quality Control Board

HERBERT ROGERS, Regional Director, Federal Water Pollution Control Administration, Southeast Region

JOHN M. RADEMACHER, Federal Water Pollution Control Administration, Southeast Region

- - -

CONTENTS

PAGE

Opening statement by Murray Stein, Chairman 5

STATEMENTS BY:

A. W. West
Federal Water Pollution Control
Administration, Southeast Region 13

Major General George H. Walker,
U.S.A., District Engineer,
South Atlantic Division,
Corps of Engineers 112

Lawrence G. Leach, South Atlantic
Division Office,
Corps of Engineers 120

F.W. Kittrell, Chief, Pollution
Evaluation Unit, Robert A. Taft
Sanitary Engineering Center,
Cincinnati, Ohio 123

Joseph L. Crockett, Jr., Director,
Technical Staff, Alabama Water
Improvement Commission 135

Herman Granberry, Manager,
Engineering-Service Division,
West Point-Pepperell, Inc.,
West Point, Georgia 155

R.S. Howard, Jr., Executive Secretary
Georgia Water Quality Control Board 178

Robert H. Morris, Assistant Chief of
Construction, Department of Construction, City of Atlanta

on behalf of:

Honorable Ivan Allen, Jr., Mayor,
City of Atlanta 302

Robert Sutton, Representing Cobb County,
Georgia, and the Cities of Smyrna,
Marietta, and Austell, Georgia 435

CONTENTS (Continued) PAGE

STATEMENTS OF:

Thomas King, On behalf of the Board of Water Commissioners, City of Columbus, Georgia. 431

Randolph Goulding, Representing the Mayor of Fairburn, Georgia, and the Council of the City of Fairburn, Georgia 437

Ralph Mills, Representing the City of Newnan, Georgia 438

W. J. Greene, Representing the Cities of Douglasville and Hogansville, Georgia 439

John W. Henderson, City Councilman, City of West Point, Georgia 443

J. H. Temples, Representing the Cities of Palmetto and Grantville, Georgia. 446

CONCLUSIONS AND RECOMMENDATIONS 453

THOSE IN ATTENDANCE:

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Atlanta, Georgia

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Vice President and Chief Engineer
Georgia Power Company
Atlanta, Georgia

R. K. Bamman
Great Northern Paper Co.
Cedar Springs, Georgia

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Superintendent of Utilities
City of West Point
West Point, Georgia

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Georgia Water Quality Control Board
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Burton J. Bell
Chattahoochee River Basin Development Commission
Atlanta, Georgia

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R. B. Betts
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T. A. Cantrell
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Otis C. Woods, Jr.
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Atlanta, Georgia

- - -

PROCEEDINGS

CHAIRMAN STEIN: The conference is open.

The report is on OR

the ~~This~~ conference ~~in~~ the matter of pollution of the interstate waters of the Chattahoochee River and its tributaries, from Atlanta, Georgia GA to Fort Gaines, Georgia GA, involving the States of Alabama and Georgia, and the for 1966 Federal Water Pollution Control Administration, is being held under the provisions of section 10 of the Federal Water Pollution Control Act. It includes statements, discussions and recommendations on: Effluent chlorination; oxygen demand loads; and related information;

I hope most of you know that the Federal Water Pollution Control Administration is now under the Department of the Interior, and I bring you greetings from Secretary Udall and the Department of the Interior. We have new bosses at the present time.

Under the provisions of the Act, the Secretary of the Interior is authorized to call a conference of this type when, on the basis of reports, surveys, or studies he has reason to believe that pollution of interstate waters subject to abatement under the Federal Act is occurring.

The purpose of the conference is to bring together the State water pollution control agencies, representatives of the Federal Water Pollution Control Administration, and other interested parties to review the existing situation, the progress which has been made, to lay a basis for future action by all parties concerned and to give the States, localities and industries an opportunity to take any indicated remedial action under State and local law.

The conference technique is rather an old one. It is used informally by many State agencies in the normal conduct of their business in the field of water pollution control.

I know, as many of you do, that the States of Georgia and Alabama use the conference technique extensively informally in their operations in the field of water pollution control.

The conference system was proposed by the United States Supreme Court as long ago as 1921 in the famous case of New York versus New Jersey, involving interstate pollution. I would like to quote from that decision:

> "We cannot withhold the suggestion, inspired by the consideration of this case, that the grave problem of sewage disposal by the large and growing population living on the shores of New York Bay is one more readily to be most wisely solved by cooperative study and by conference and mutual concession on the part of representatives of the States so vitally interested in it than by proceedings in any court however constituted."

We strongly support the conference technique, and we measure our success by the problems which are solved at the conference table, rather than in court.

As specified in section 10 of the Federal Water Pollution Control Act, the Secretary of the Interior has notified the official State water pollution control agencies of this conference. These agencies are the Georgia Water Quality Control Board and the Alabama Water Improvement Commission. This conference, between these official State water pollution control agencies and the Federal Water Pollution Control Administration, is the one that is specified by the law. These parties are the conferees. These agencies may bring whomever they wish to the conference and have them participate in it. However, only the representatives of the official State agencies and the Federal Water Pollution Control Administration constitute the conferees.

The State of Alabama has designated as its conferee for this conference Dr. Ira L. Myers, and he will be accompanied by Mr. Joe Crockett. Both of these are old colleagues.

When we set up this conference, I confidently expected Mr. Arthur Beck, whom we have been working with these many years, to be here. But, unfortunately, Arthur could not make it. I would like to convey my best regards to

Arthur, who is a little under the weather at the present time.

Georgia will be represented by Mr. R. S. Howard, "Rock" Howard.

The Federal conferees are Mr. Herbert Rogers on my far right, with headquarters in Atlanta, and Mr. John Rademacher, lately of Denver and Chicago.

My name is Murray Stein, and I am from headquarters of the Department of Interior in Washington.

Both the States and the Federal Government have responsibilities in dealing with water pollution control problems. The Federal Water Pollution Control Act declares that the States have primary rights and responsibilities for taking action to abate and control pollution. Consistent with this, we are charged by law to encourage the States in these activities.

At the same time, the Secretary of the Interior is charged by law with specific responsibilities in the field of water pollution control in connection with pollution of interstate waters. The Federal Water Pollution Control Act provides that pollution of interstate waters, whether the matter causing or contributing to the pollution is discharged directly into such waters, or reaches such waters after discharge into a tributary of such waters, which endangers the health or welfare of persons in a State other than that in which the discharge originates, is subject to abatement.

The conference will be useful, we hope, in providing a clear picture of the problem, delineating the progress which has already been accomplished, and in indicating what needs to be done to correct the pollution problem in these interstate waters.

All the conferees will be called upon to make statements. The conferees, in addition, may call upon participants whom they have invited to the conference to make statements. At the conclusion of the statements, the conferees will be given an opportunity to comment or ask questions, and at the conclusion of the conferees' comments or questions, I may ask a question or two. This procedure has in the past proven effective in reaching equitable solutions.

At the end of all the statements, we will have a discussion among the conferees and try to arrive at a basis of agreement on the facts of the situation. Then we will attempt to summarize the conference orally, giving the conferees, of course, the right to amend or modify the summary.

It always is a little difficult to predict what is going to happen, and I would like to be tentative on this, because we are here and we are going to stay here until everyone has a full opportunity to be heard.

We expect the Federal people to make their presentation first, both the Department of the Interior and other Federal agencies such as the Corps of Engineers. We expect this might take most of the morning. We probably will recess for lunch between twelve and two.

We would then call on the State of Alabama and then on the State of Georgia. Hopefully, we can get all the statements and the comments into the record today.

If this is done, the conferees will have an executive session beginning tomorrow morning where we will attempt to come up with a summary and then come up with an announcement. This announcement will probably be sometime about noon tomorrow unless we notify you to the contrary.

Sometimes situations come up or problems come up that we have not foreseen, but I think this is the kind of case where we are pretty familiar with the river, the States are familiar with the river, and we know that we and the States have been working on this problem for many years. I think most of the problems are visible now in the sense that we probably can project a schedule.

This is for your information so you can adjust your schedule and your attendance accordingly.

Under the Federal law, the Secretary of the

Interior is required at the conclusion of the conference to prepare a summary of it which will be sent to all the conferees. The summary, according to law, must include the following points:

1. Occurrence of pollution of interstate waters subject to abatement under the Federal Act;

2. Adequacy of measures taken toward abatement of pollution; and,

3. Nature of delays, if any, being encountered in abating the pollution.

The Secretary is also required to make recommendations for remedial action if such recommendations are indicated.

Now, a word about the procedure governing the record of the conference. A verbatim report of the conferance is being made by Mr. Joe McLaughlin who is down here. He is a private contractor not regularly employed by the Government and only contracted with us for this conference. If you want to get copies of the transcript before it comes out, you will have to make your own arrangements with his firm in order to get them.

We, however, will expect to have a printed verbatim record of the conference available in about three months, which has been our lead time, which will be made available to the States, and you can, by application to the State, get a free copy at that time. But if you need a copy or feel you have to have one beforehand, you have to make your own arrangements with the Reporter.

The verbatim transcript is made for the purpose of aiding us in preparing a summary and also providing the complete record of what is said here.

Now, I would like to suggest that all speakers and participants other than the conferees at this table who make a statement come to the lectern and identify themselves for the purpose of the record.

At this point I would like to call on Mr. Herbert Rogers of the Federal Water Pollution Control Agency for the presentation of the Federal Government.

Mr. Rogers.

MR. ROGERS: I am Herbert Rogers, Regional Director of the Federal Water Pollution Control Administration for the Southeast Region in Atlanta.

I would like to inquire first if we have any representatives here from Congressman Weltner's office.

(No response.)

From Congressman MacKay's office?

(No response.)

They both indicated they would probably have someone here. If they come in later, we will introduce them.

As the first part of our presentation, I would like to call on Mr. Al West, who is with the staff of the Federal Water Pollution Control Administration in Cincinnati. He will present the report of the Federal Water Pollution Control Administration.

Mr. West, would you come up, please?

STATEMENT OF

A. W. WEST, PUBLIC HEALTH ENGINEER,
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, CINCINNATI, OHIO

MR. WEST: Mr. Chairman, Conferees, participants and friends: The Department of Interior has prepared a report on pollution of the Chattahoochee River. I expect to read most of it here, but there are a few areas where I will condense, and for that reason I would like to have the full report included in the record. I will pass this on to the Reporter.

CHAIRMAN STEIN: Without objection, the full report will be included as if read.

MR. WEST: Thank you.

INTRODUCTION

Stream surveys and investigations of water uses, sources of wastes, and effects of pollution on water quality and uses were conducted along the Chattahoochee River in 1964 and 1965 to determine whether pollution originating in Georgia or Alabama endangers the health or welfare of persons in a State other than that in which the discharge or discharges originate.

This report on pollution of the interstate waters of the Chattahoochee River is based on stream surveys directed by the United States Department of Health, Education, and Welfare -- we are now the Department of Interior -- and upon information provided by the Georgia Water Quality Control Board, the Georgia Department of Public Health, the Alabama Water Improvement Commission and municipalities in Georgia and Alabama.

The Georgia Water Quality Control Board and the Georgia Department of Public Health provided the essential information describing sources of wastes and status of treatment in Georgia communities. The Georgia Department of Public Health analyzed many bacteriological samples collected by the Public Health Service during the October-November 1964 survey. The Alabama Water Improvement Commission furnished complete data from their 1961-1962 on-site investigations of sewage and industrial waste loads from municipalities and industries in the Lanett-Fairfax-Langdale River View area. Valuable information describing the sewerage systems and treatment works were provided by city officials in Atlanta and Newnan. Similar information, including sewage treatment plant operating logs and data sheets were provided by officials in Columbus, Phenix City, and Fort Benning. Representatives of the Georgia Power Company and the U.S. Geological Survey provided river discharge data.

The description of river water quality is based on the results of two field investigations conducted specifically for this purpose.

The first survey, extending from the Georgia Highway 92 bridge, about 20 miles below Atlanta, to the upper part of Lake Harding, was conducted from October 19 to November 6, 1964. Bacteriological, chemical and biochemical tests were run on one-per-day spot samples collected from ten locations along the Chattahoochee and from a single location in each of three tributary creeks. Representatives of both the Georgia Department of Public Health and the U. S. Public Health Service participated in this cooperative survey.

The second survey, conducted by U. S. Public Health Service personnel from June 28 to July 3, 1965, extended from Columbus, Georgia into the Walter F. George Reservoir. Total coliform, fecal coliform, and Salmonella bacteria examinations were made on river and reservoir waters, and sewage treatment plant effluent samples. During this bacteriological survey, river water samples were collected at 8-hour intervals, around the clock, during five successive days. Dissolved oxygen and temperature were determined at various depths in the reservoir and a dye study was conducted to determine the flow time from Columbus to River Bend Park. A survey team from the Mead Corporation participated in the dissolved oxygen and time of travel studies and assisted Public Health Service personnel during field operations.

Data from other reports and special surveys were also used to supplement information gathered during the two general surveys in the Atlanta-Lake Harding Reservoir and the Columbus-Walter F. George Reservoir areas.

The Georgia Water Quality Control Board and the Alabama Water Improvement Commission conduct active water pollution control programs within their respective States. Their accomplishments have been many, and specific information regarding official action, progress and attainment of pollution abatement goals by the States, and by municipalities and industries within the States, can be obtained directly from these two-State agencies.

We did not include all of the action being taken by the States in this report, except to recognize the work that was being done, because we know that the details of the State activities will be presented to you by the official representatives of the States today.

The generous assistance provided by representatives of Federal, State, and municipal agencies and industry, and Public Health Service personnel in the Atlanta Regional Office and the Robert A. Taft Sanitary Engineering Center in Cincinnati, is deeply appreciated and gratefully acknowledged.

THE AREA

The Chattahoochee River is one of the major interstate rivers of the Southeast. Rising in northern Georgia, it flows southwest to West Point and Lanett and then forms the boundary between Georgia and Alabama as it flows south into the Apalachicola River in Florida.

The 225-mile reach of the river considered in this report extends from Atlanta to Fort Gaines, Georgia. Of this reach, 100 miles are in Georgia, and 125 miles form the boundary between Georgia and Alabama.

The Walter F. George Reservoir below Columbus is the largest of 10 impoundments which have been created by power, navigation, or flood protection dams within this reach. Filled in 1962, the Walter F. George Reservoir extends 85 miles upstream from Fort Gaines to Columbus, covers 45,000 acres, forms 515 miles of shore line, and is used extensively for boating, fishing, water-skiing, and general recreation.

Cottages and homes have been constructed along the shores of the much smaller Lake Harding, which was formed by the Bartletts Ferry Dam below West Point and Lanett.

An additional large reservoir extending 35 miles upstream from West Point toward Atlanta, with an additional 23,500 acres of potential recreational water and more than 100 miles of waterfront shore line, is being planned.

(Figure 1, a location map, follows:)

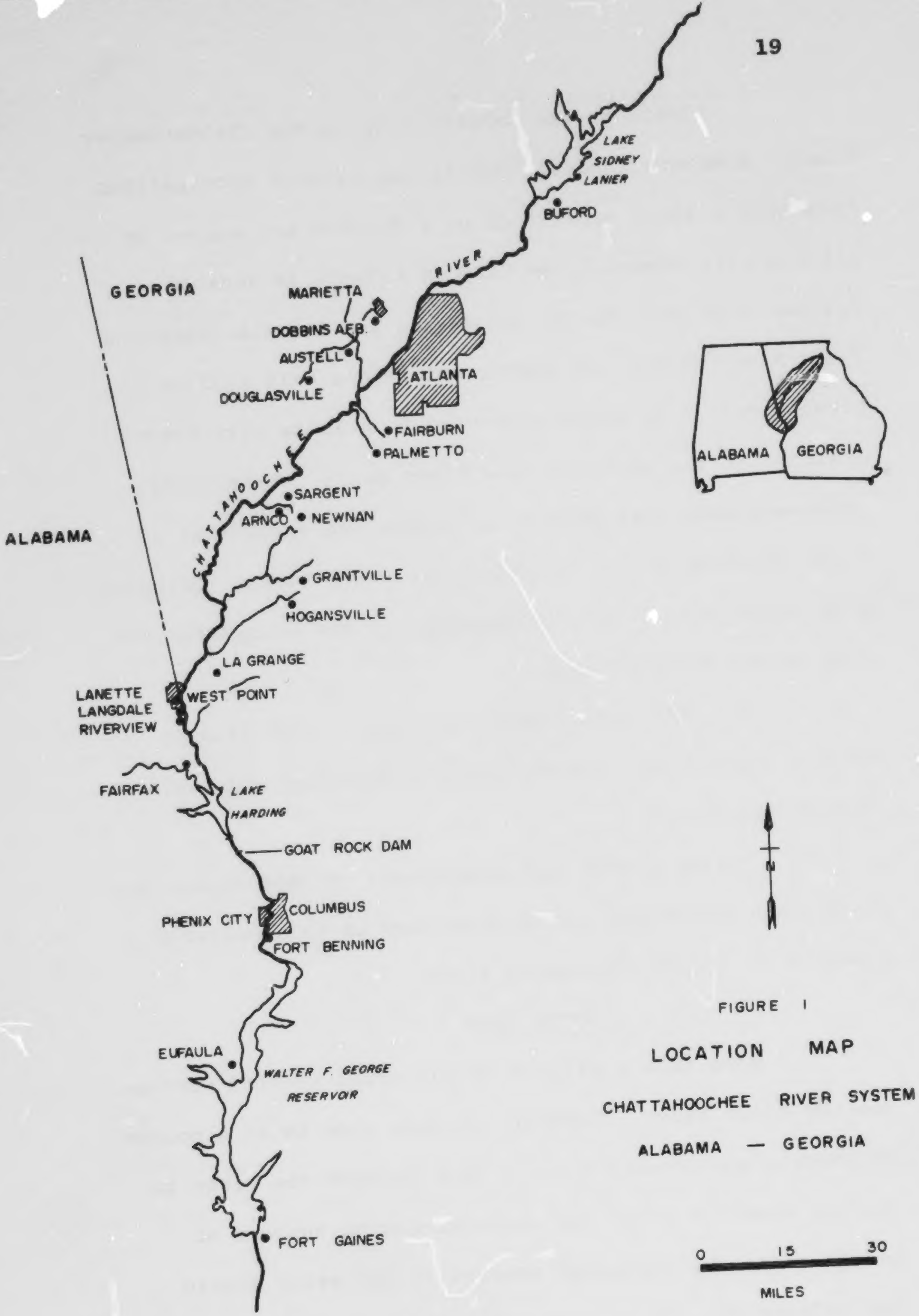

LAKE SIDNEY LANIER
BUFORD
RIVER
GEORGIA
MARIETTA
DOBBINS AFB.
AUSTELL
DOUGLASVILLE
ATLANTA
FAIRBURN
PALMETTO
CHATTAHOOCHEE
SARGENT
ARNCO
NEWNAN
ALABAMA
GRANTVILLE
HOGANSVILLE
LA GRANGE
LANETTE
LANGDALE
RIVERVIEW
WEST POINT
FAIRFAX
LAKE HARDING
GOAT ROCK DAM
PHENIX CITY
COLUMBUS
FORT BENNING
EUFAULA
WALTER F. GEORGE RESERVOIR
FORT GAINES
ALABAMA
GEORGIA
N
0
15
30
MILES

FIGURE 1

LOCATION MAP

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA — GEORGIA

Atlanta is the largest city on the Chattahoochee River. Numerous subdivisions in the Atlanta Metropolitan Area with a total population of 1,200,000 are served by Atlanta city sewers. The City of Atlanta is located astride a natural divide separating the Chattahoochee and Flint River basins and approximately one half million persons reside in areas connected to Atlanta city sewers draining to the Chattahoochee River Basin. This report discusses only that portion of sewage and industrial waste draining to the Chattahoochee River Basin. Columbus, with approximately 150,000 persons, is the second-largest city in the surveyed area.

An additional quarter million people live in smaller communities located along tributaries and the main stem of the river.

Future growth and development of this region depends upon protection and preservation of this valuable resource -- the Chattahoochee River.

WATER USES

More than a million people drink treated Chattahoochee River water. Industry depends upon it as a source of process and cooling water. Dams harness the river to produce electric power and ever-increasing numbers of people enjoy the impounded reservoirs for water sports and relaxation. It is also the receptacle for industrial wastes and treated and untreated municipal sewage.

One hundred and fifty million gallons of river water per day are used by the nine domestic water supply systems listed in Table 2. Of this total, more than one-half (83 MGD) is used in Atlanta, 26 MGD in DeKalb County, 18 MGD in Columbus, 14 MGD in Cobb County and less than 2.5 MGD each in Gwinnett County, LaGrange, West Point, Lanett and Phenix City. Approximately 25 MGD of this total is withdrawn from the Chattahoochee River downstream from the Atlanta City sewer outfalls. DeKalb, Cobb and Gwinnett County, and the City of Atlanta water supply intakes are located upstream from Atlanta, and are not affected by sewage from Atlanta and other downstream communities.

Additional river water is used by diversified industry in Atlanta and the textile mills in LaGrance, Lanett and Columbus. Initially, the proposed Alabama Kraft Company mill, to be located along the shore of the Walter F. George Reservoir at Mahrt, Alabama, will use about 12 million gallons of reservoir water per day in the production of Kraft paper liner board.

More than 400,000 kilowatts of electric power are generated at 10 hydroelectric power dams located between Buford, Georgia and Ft. Gaines, Alabama. (Table 3.) Three steam-electric power plants, the Atkinson and Jack McDonough plants of Atlanta, and the Yates Plant at

Yates, Georgia, circulate 1,400 million gallons of river water per day through their condensers while producing 1,280,000 kilowatts of electric power. The combined cooling water volume demand of the adjacent Atkinson and Jack McDonough plants at times exceeds the total Chattahoochee River discharge during the low flow seasons of the year.

People fish along many miles of the river proper, but the most intense recreational use occurs in the impounded reservoirs. Homes and summer cottages have been built along the shores of Lake Harding, below West Point and Walter F. George Reservoir below Columbus. Boat landings, marinas, and public parks flourish during the summer recreational season. Thousands of natives and tourists alike fish, swim, boat, and water-ski in these waters, particularly in Walter F. George Reservoir. When the proposed dam is constructed above West Point, a vast new reservoir will be available for water-oriented recreation along the Chattahoochee River.

SOURCES OF WASTES

GENERAL

Both sewage and industrial wastes contain a variety of obnoxious constitutents which can damage water quality and restrict its use. Oxygen-demanding materials can limit or destroy fish, fish food organisms, and other desirable aquatic life by removing dissolved oxygen from the river. Greasy substances can form objectionable surface scums, settleable solids can create sludge deposits, and suspended materials can make once attractive waters appear turbid and dingy.

Industrial wastes may also contain additional objectionable chemicals and toxic substances that can kill aquatic life, taint fish flesh, or promote slime growths in the receiving waters. Heat from steam-electric generating plants can magnify the adverse effects of other decomposing wastes and, if excessive, can injure or kill fish and acquatic life.

Sewage contains astronomical numbers of intestinal bacteria which were released in man's excretions. Some of these may be pathogens which can reinfect man.

The oxygen demand of sewage and industrial wastes, as measured by the 5-day biochemical oxygen demand test (which is usually referred to simply at the BOD), indicates their potential for reducing the dissolved oxygen content of the river waters. The coliform bacteria content of raw and treated sewage indicates the density of sewage-associated bacteria, which may include disease-producing pathogens, discharged to the river. The oxygen-demanding loads are expressed as population equivalents (PE) of 5-day biochemical oxygen demand (BOD) and the bacterial loads are expressed as bacterial population equivalents (BPE) of total coliform bacteria. Each PE or BPE unit represents the average amount of oxygen demand or coliform bacteria normally contained in sewage contributed by one person in one day.

The amount of oxygen-demanding material produced from the sewage of one person is about one-sixth of a pound of BOD per day. In the same manner, the sewage from one person contains on the average approximately 400 billion coliform bacteria per day.

The amount of such pollutional constituents in sewage that can be removed by sewage treatment works depends upon the type and capacity of the plants, and the skill of the operators. Types of sewage treatment plants in this area are identified in this report as primary or secondary, with or without chlorination.

Primary treatment plants, which consist essentially of settling tanks and sludge digesters, can remove most of the scums and settleable solids, about one-third of the oxygen-demanding BOD, and approximately 50 per cent of the bacteria. Secondary plants consist of primary units plus secondary biological treatment units, which are usually added onto the primary treatment plants, which consists of units such as trickling filters, activated sludge or oxidation lagoons. These plants are more efficient, of course, and can remove about 80 to 95 per cent of the BOD and the coliform bacteria.

Chlorination facilities for disinfection of properly treated sewage plant effluents can destroy more than 99.9 per cent of the sewage bacteria. But the same old caution: To accomplish these reductions, treatment facilities must be properly designed, must be adequately sized, and must be operated skillfully.

Now, coming back to the loads to the Chattahoochee River, raw and treated sewage from 26 cities and communities, untreated wastes from nine separate industries, and heat from three steam-electric generating plants are discharged to the surveyed reach of the Chattahoochee River watershed covered by this report.

BACTERIAL LOADS (SEWAGE)

Almost one-half million (476,645 BPE) population equivalents of coliform bacteria were discharged to the surveyed area of the Chattahoochee River watershed. Less than one-half (46 per cent) of the bacteria in the sewage from 883,100 persons residing in this area were removed by treatment.

The proportionate bacterial loads discharged by individual municipalities are illustrated on Figure 2, and tabulated in Tables 4 and 5.

(Tables referred to in this report appear in the appendices following the report.)

(Figure 2, above referred to, follows:)

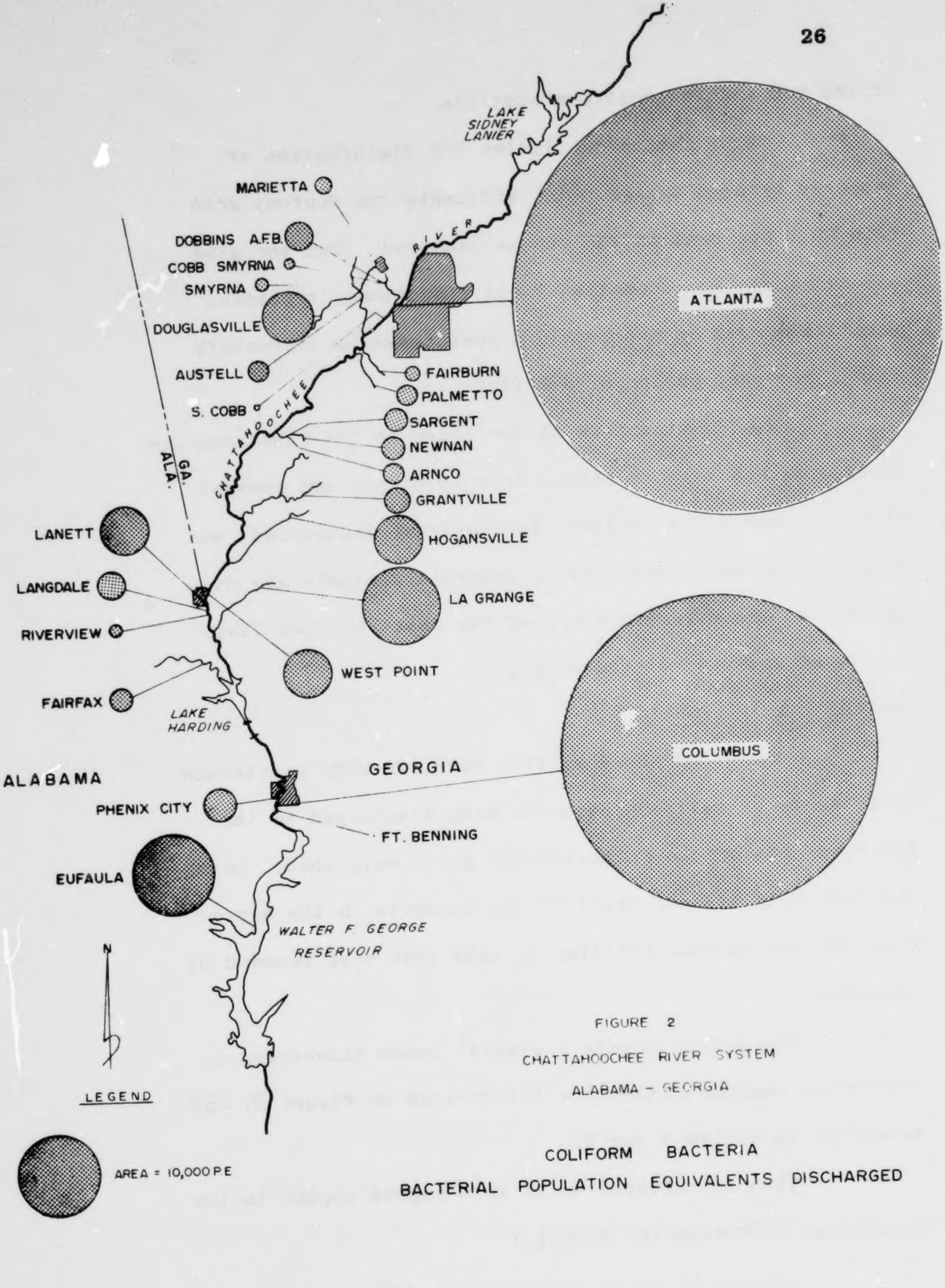

LAKE SIDNEY LANIER
MARIETTA
DOBBINS A.F.B.
COBB SMYRNA
SMYRNA
DOUGLASVILLE
AUSTELL
S. COBB
RIVER
CHATTAHOOCHEE
ATLANTA
FAIRBURN
PALMETTO
SARGENT
NEWNAN
ARNCO
GRANTVILLE
HOGANSVILLE
LA GRANGE
GA.
ALA.
LANETT
LANGDALE
RIVERVIEW
WEST POINT
FAIRFAX
LAKE HARDING
ALABAMA
GEORGIA
COLUMBUS
PHENIX CITY
FT. BENNING
EUFAULA
WALTER F. GEORGE RESERVOIR
N
LEGEND
AREA = 10,000 P.E

FIGURE 2

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA – GEORGIA

COLIFORM BACTERIA

BACTERIAL POPULATION EQUIVALENTS DISCHARGED

Atlanta, Georgia

More than half (59.3 per cent) of the entire sewage-associated bacterial load entering the river was discharged from Atlanta.

Atlanta, with a sewered population of almost one-half million persons (485,100) residing in the Chattahoochie River Drainage Basin, operates five primary sewage treatment plants without chlorination. These plants remove an estimated 42 per cent of the coliform bacteria, but discharge approximately 282,400 bacterial population equivalents to the river.

About 80 per cent of Atlanta's sewage is treated at the overloaded Clayton Plant where approximately 62 million gallons per day (MGD) of sewage reaches this plant which was designed to handle only 42 MGD. Sewage flows exceeded the plant capacity more than 25 per cent of the time in 1964, and for 2,400 hours part of the raw sewage was bypassed to the river without treatment. Additional raw sewage from combined storm and sanitary sewers reaches the river during periods of heavy rainfall.

Columbus, Georgia

The second-largest bacterial load was discharged by Columbus, Georgia. Untreated sewage from 118,000 persons, plus the residual 32,000 BPE from the new primary sewage treatment plant, totaled 150,000 BPE, or 31 per cent of the total load to the watershed. The treatment plant effluent is not chlorinated, and during the June 1965 survey, 220,000,000 total coliform bacteria per 100 ml were measured in the treatment of plant effluent.

All of this sewage entered the headwaters of Walter F. George Reservoir, which is used extensively for water contact recreation.

Approximately 6.0 million gallons per day (MGD) of sewage was treated in the new 25 MGD capacity of Columbus primary sewage treatment plant during the June 1965 survey. Upon completion of the interceptor system, an additional 14.0 MGD of sewage will be treated in this plant, but final effluent chlorination facilities have not been provided to disinfect the effluent.

Approximately 0.5 MGD of untreated sewage which entered the river from a midwestern part of the city, and the discharge from a 15-inch sewer interceptor, which entered the river south of the primary plant, are outside of the sewered areas served by the existing primary and proposed secondary treatment plants.

Cobb and Douglas Counties

Approximately 100,000 persons reside in sewered areas of nine communities located west of Atlanta and across the Chattahoochee River in Cobb and Douglas counties. Ninety-four per cent of the coliform bacteria from this area were removed by treatment, leaving a residual of 6,630 BPE entering the river.

Marietta, Cobb-Smyrna, Smyrna and South Cobb County operate secondary plants with effluent chlorination. Dobbins Air Force Base and Cobb County subdivisions operate secondary plants without chlorination, and Douglasville and Austell operate primary plants. Individual bacterial loads from each of these individual plants are shown on Figure 2 and in Tables 4 and 5.

Eighty-five per cent of the total coliform load entering the streams in this area is attributed to the effluents from those treatment plants, especially the primary units, that lack chlorination facilities. Secondary plants with chlorination facilities are assumed to provide satisfactory removal of sewage bacteria.

Between Atlanta and West Point

Approximately 44,000 persons reside in sewered areas of the eight communities between Atlanta and West Point. Treatment plants, none of which include effluent chlorination facilities, removed about 65 per cent of the coliform bacteria and the residual 15,280 BPE was discharged to tributaries of the Chattahoochee River.

Fairburn, Newnan, and La Grange operate secondary plants. Palmetto, Arnco, Sargent, Grantville, and Hogansville operate primary plants. Eighty-five per cent of Hogansville sewage and 22 per cent of La Grange sewage were discharged without treatment. These plants, the secondary units that lack chlorination, and especially the primary units that are outmoded or overloaded, do not provide effective bacteriological removal.

At La Grange a new high rate trickling filter plant is under construction to treat the sewage which formerly entered Yellow Jacket Creek untreated.

West Point and Lanett Area

Untreated sewage from West Point, Georgia (population 3,900) is discharged directly into the Chattahoochee River only one mile upstream from the Lanett, Alabama municipal water works intake.

Untreated sewage from Lanett, Langdale-Shawmut, and River View, Alabama, also enters the river without treatment. Effluent from the ineffective Fairfax, Alabama, Imhoff tank is discharged to the Osanippa Creek, tributary of the Chattahoochee River.

This untreated sewage, from 10,560 persons, enters the river 7 to 15 miles above the recreational waters of the Lake Harding impoundment.

Walter F. George Reseroir Area

Raw and treated sewage from Columbus, Georgia, Phenix City and Eufaula, Alabama, and Fort Benning enter the river in the vicinity of the Walter F. George Reservoir. Treatment removes only 32 per cent of the coliform bacteria in this sewage from approximately one-quarter of a million persons (239,400), and a residual of 162,000 population equivalents of sewage bacteria is discharged to the waters of this recreational area.

The 150,000 BPE bacterial load from Columbus, second-largest source in the survey area, has been discussed previously.

Phenix City, with a population of 28,700, operates a new secondary treatment plant equipped for effluent chlorination. During the survey, however, the chlorination facilities were not effective. The coliform content of the final effluent amounted to 2,200,000 per 100 ml, and 1,770 bacterial population equivalents were discharged to the river in the final effluent.

We should recognize this plant did produce excellent reductions of other pollutional constituents, and could reduce the bacterial load to suitable levels if the chlorination facilities are operated effectively.

All of Fort Benning's sewage is treated in three plants. Two are primary plants with chlorination, and the third is an activated sludge type secondary treatment plant followed by detention in a natural pond. Bacteriological treatment was excellent. The effluent from the two plants employing chlorination contained 300 and 1,500 coliform organisms per 100 ml, respectively, and that from the activated sludge plant contained 4,900. We are comparing these low effluents with raw sewage that may contain as much as 20 million coliform per 100 ml. Therefore, treatment removed 99.99 per cent of the sewage bacteria, and the bacteria in the effluents from Fort Benning were equivalent to the raw sewage from about five people by the time the treated effluent reached the river.

Sewage from Eufaula (population 10,000) was discharged to the Walter F. George Reservoir without treatment during the survey.

OXYGEN DEMAND LOADS (SEWAGE AND INDUSTRIAL WASTE)

One million population equivalents of oxygen-demanding material were discharged to the surveyed area of the Chattahoochee River watershed. Less than one-third of the original one and one-half million population equivalents was removed by treatment.

Raw and treated municipal sewage made up 78 per cent (814,219 PE), and separate untreated industrial waste discharges amounted to 22 per cent (225,240 PE) of the net BOD load entering the rivers.

The proportionate loads discharged by municipalities and industries are illustrated on Figure 3. Details are tabulated in Tables 4 and 5.

(Figure 3, above referred to, follows:)

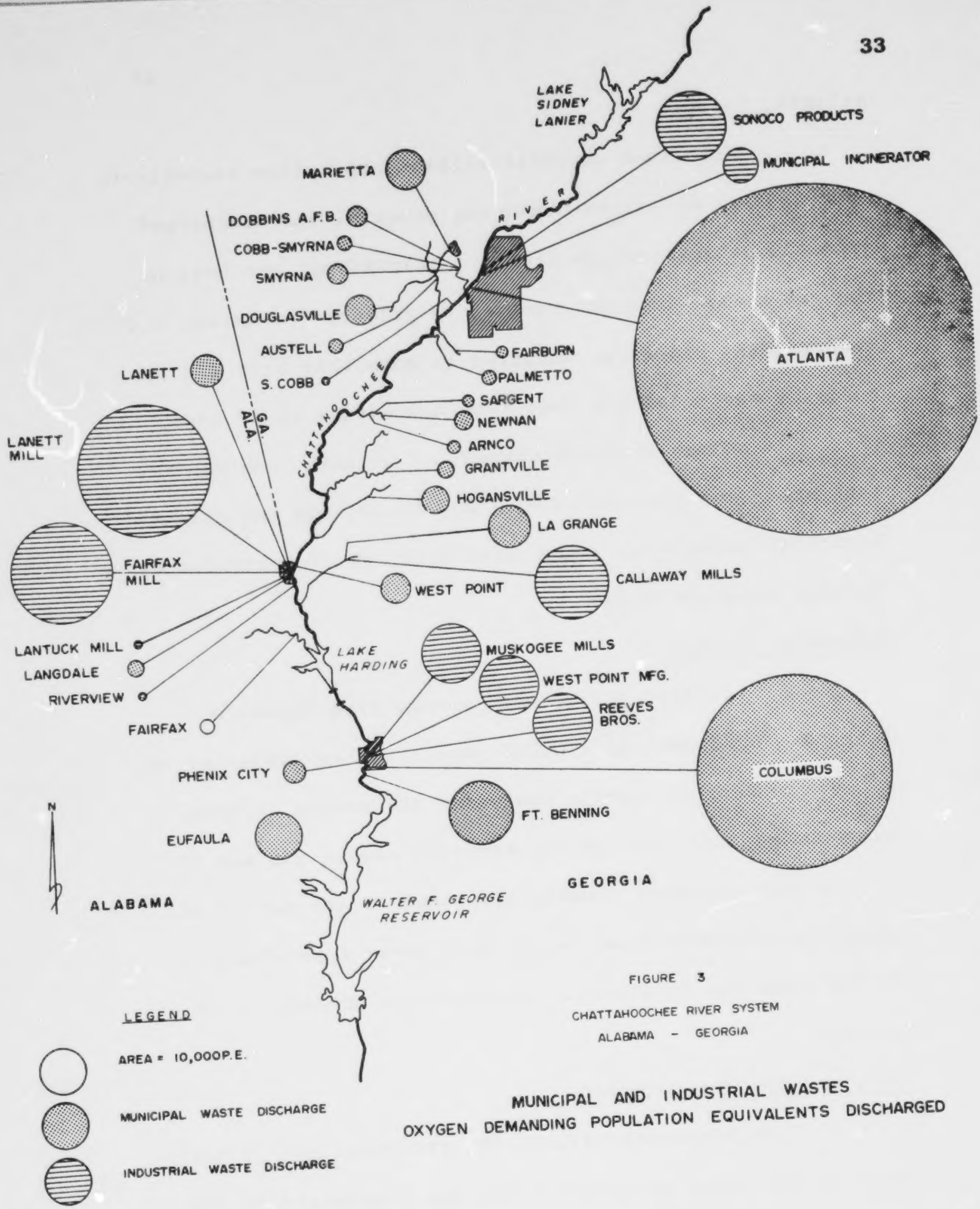

LAKE SIDNEY LANIER
SONOCO PRODUCTS
MUNICIPAL INCINERATOR
MARIETTA
RIVER
DOBBINS A.F.B.
COBB-SMYRNA
SMYRNA
DOUGLASVILLE
AUSTELL
S. COBB
ATLANTA
FAIRBURN
PALMETTO
LANETT
SARGENT
NEWNAN
ARNCO
GRANTVILLE
HOGANSVILLE
CHATTAHOOCHEE
GA.
ALA.
LANETT MILL
LA GRANGE
FAIRFAX MILL
WEST POINT
CALLAWAY MILLS
LANTUCK MILL
LANGDALE
RIVERVIEW
FAIRFAX
LAKE HARDING
MUSKOGEE MILLS
WEST POINT MFG.
REEVES BROS.
COLUMBUS
PHENIX CITY
FT. BENNING
EUFAULA
N
ALABAMA
GEORGIA
WALTER F. GEORGE RESERVOIR
LEGEND
AREA = 10,000P.E.
MUNICIPAL WASTE DISCHARGE
INDUSTRIAL WASTE DISCHARGE

FIGURE 3

CHATTAHOOCHEE RIVER SYSTEM
ALABAMA - GEORGIA

MUNICIPAL AND INDUSTRIAL WASTES
OXYGEN DEMANDING POPULATION EQUIVALENTS DISCHARGED

Atlanta, Georgia

More than one-half million population equivalents (564,360 PE) of oxygen-demanding material was discharged from the Atlanta sewage plants. Thirty-four per cent of the raw sewage load was removed by primary treatment, but the residual discharge amounted to more than half (54 per cent) of the total BOD load from the entire study area.

Sonoco Products Company of Atlanta, manufacturing paper products, discharged 20,000 PE, and the Atlanta Municipal Incinerator discharged 5,200 PE of untreated wastes through separate sewers.

Columbus, Georgia

Untreated and treated sewage from Columbus, Georgia, approximating 176,000 population equivalents, or 17 per cent of the total, comprised the second largest oxygen-demanding load in the surveyed area. Six MGD of city sewage received primary treatment at the new 25 MGD capacity treatment plant which will treat approximately 20 MGD when the interceptor construction project is completed.

Cobb and Douglas Counties

Approximately 17,000 PE, representing 1.6 per cent of the total area-wide load, was discharged by the communities in Cobb and Douglas counties. About 84 per cent of the 104,750 PE raw sewage BOD was removed by the treatment plants, most of which were secondary units providing high BOD removal efficiencies.

Between Atlanta and West Point

Approximately 17,000 PE were discharged to the watercourse in this area. As detailed in Table 4, three of the communities operate secondary plants, five operate less effective primary plants, and two discharge part of their sewage without treatment. Sixty-one per cent of the original 42,430 PE raw sewage was removed by treatment.

Callaway Mills of La Grange, textile manufacturers, discharged approximately 24,000 PE of treated wastes to the stream.

CHAIRMAN STEIN: Pardon me, Mr. West. That discharge from Callaway Mills is untreated, isn't it? Not treated?

MR. WEST: It is untreated. Thank you for the correction. I read this wrong.

Callaway Mills discharges approximately 24,000 PE of untreated wastes to the stream.

West Point and Lanett Area

Sewage and industrial wastes from this area, except the 0.1 MGD flowing through the ineffective Fairfax-Imhoff tank, enters the rivers without treatment. The 138,600 PE total included raw sewage from the 10,560 persons residing in this area.

The untreated industrial waste portion of the load, discharged by the textile mills in Lanett, amounted to 128,040 population equivalents of BOD. Of these 79,000 PE was discharged by the Lanett Mill Bleaching and Dye Works, 48,750 PE by the Fairfax Mill, and 290 by the Lantuck Mill.

Walter F. George Reservoir Area

One-quarter million population equivalents of oxygen-demanding wastes are discharged into the headwaters of Walter F. George Reservoir. Eighty per cent of this load is from treated and untreated sewage, and 20 per cent is from separate untreated industrial waste sources.

The 176,000 PE load from Columbus, second-largest source in the entire Chattahoochee River survey area, has been discussed previously.

Excellent BOD reductions were accomplished by the new Phenix City secondary sewage treatment plant. Ninety-two per cent of the original 28,700 PE was removed, and the residual 2,300 PE entered the river.

Fort Benning's three treatment plants removed 65 per cent of the original BOD, and 17,520 PE reached the river.

Three textile mills in Columbus, Georgia, (Muskogee Mill, West Point Manufacturing Company, and Reeves Bros.) discharged approximately 48,000 PE of untreated industrial wastes to the river through separate sewers. It is estimated that approximately 16,000 PE was discharged from each of these three mills.

EFFECTS OF POLLUTION ON WATER QUALITY AND USE

BACTERIAL POLLUTION

More than 100 miles of the Chattahooche River from Atlanta to upper Lake Harding, 35 miles from Columbus to Florence Landing in the Walter F. George Reservoir, and localized areas of the Walter F. George Reservoir near Eufaula, were polluted with sewage-associated bacteria.

Water polluted by sewage frequently contains pathogenic bacteria which, if ingested can cause gastrointestinal diseases, such as typhoid fever, dysentery, and diarrhea. Body contact with sewage-polluted water can cause eye, ear, nose, throat, or skin infections. The infectious hepatitis virus, and other viruses, may also be present. Excessive bacterial pollution of a river, or a reservoir, presents a health hazard to all who come in contact with the water.

Sewage also contains readily detectable coliform bacteria, which typically occur in excreta or feces. Though generally harmless in themselves, these coliform bacteria are always present in sewage-polluted water and have therefore been considered indicators of the probable presence of pathogenic bacteria. Many State and interstate water pollution control agencies evaluate water quality on the basis of sanitary survey findings and total coliform content. Decisions based on total coliform data alone, however, have sometimes been challenged because bacteria from sources other than excretia are included in the overall total coliform group.

Within recent years a more selective test has been developed to identify fecal coliform bacteria, which specifically inhabit the intestinal tract of man and warm-blooded animals. The presence of these organisms in water is positive proof of fecal contamination which may contain associated disease-producing organisms such as Salmonella.

More recently, refined methods for isolation and detection of Salmonella organisms have made it practical to test for these specific infectious disease organisms.

Bacterial analyses were limited to total coliform determinations during the October-November 1964 survey from Atlanta to Lake Harding. The June-July 1965 survey in the vicinity of Columbus and Walter F. George Reservoir included total coliform, fecal coliform, and Salmonella determinations.

Coliform Bacteria

Neither the State of Alabama nor the State of Georgia have established standards for coliform bacterial density. Where water quality criteria have been established, a commonly accepted upper limit for river water used as a source of treated domestic water supply and for boating, fishing and general recreation is 5,000 coliform bacteria per 100 ml. A commonly accepted upper limit for swimming, skiing and other water contact sports is 1,000 per 100 ml.

Coliform densities measured in the Chattahoochee River and impoundments are illustrated on Figure 4 and detailed in Tables 6, 7 and 8.

(Figure 4, above referred to follows:)

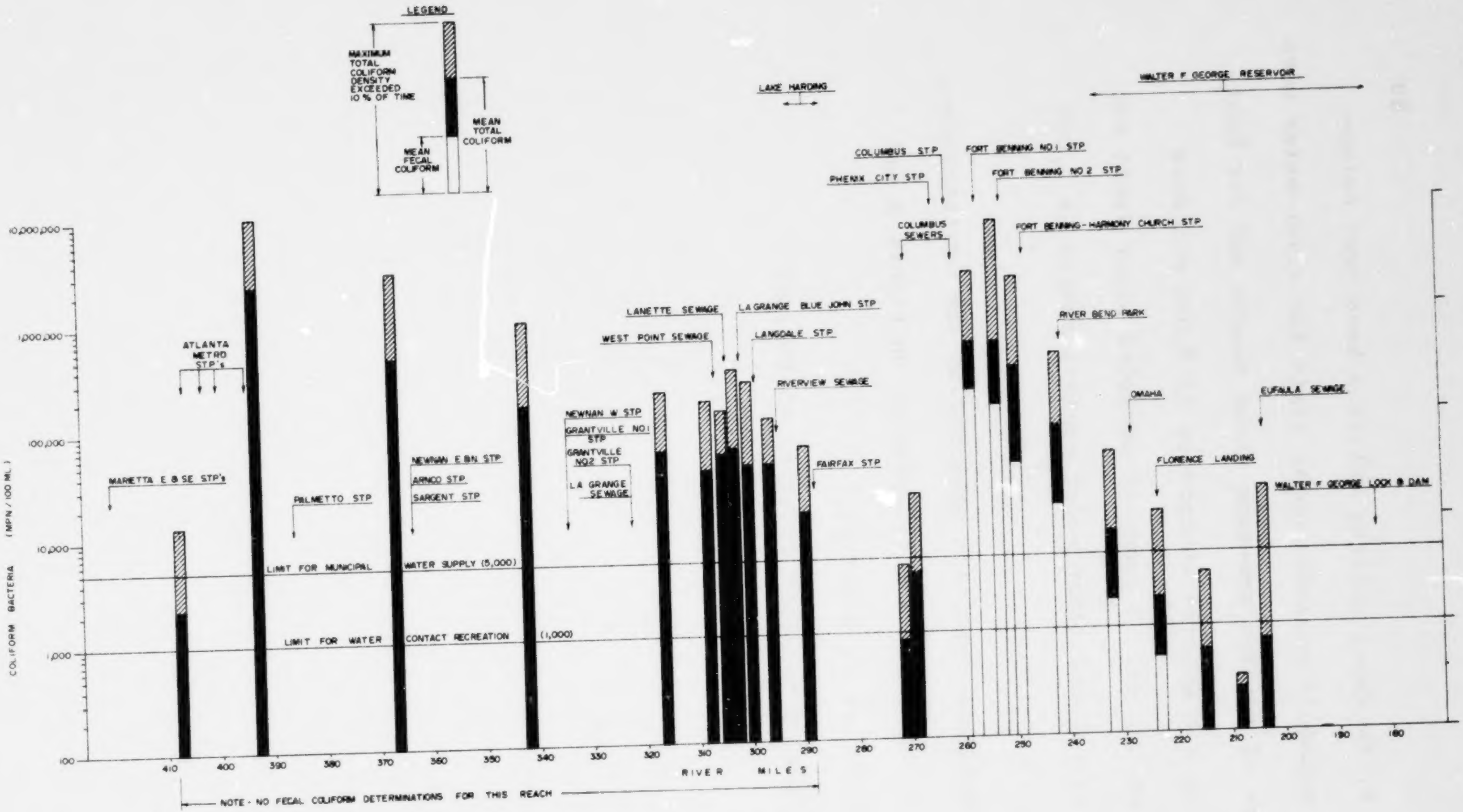


FIGURE 4

COLIFORM BACTERIA

CHATTAHOOCHEE RIVER SYSTEM
ALABAMA — GEORGIA

The mean densities were determined from probability plots of observed data. The coliform density that was equalled or exceeded 10 per cent of the time, rather than the single highest observed value, is referred to as the maximum density.

Although coliform densities equalled or exceeded 13,000 per 100 ml 10 per cent of the time, the 2,200 mean density in the Chattahoochee River at the Atlanta Water Works intake met the 5,000 MPN/100 ml water supply criteria.

Nineteen miles downstream from the Atlanta Metropolitan Area sewers, at the Highway 92 bridge, the mean coliform density was increased 1,000-fold to 2,400,000 and equalled or exceeded 10,000,000 MPN/100 ml 10 per cent of the time.

Coliform densities were reduced by natural purification and normal bacterial die-off as the river flowed 85 miles to West Point. The numbers of residual coliforms destroyed greatly exceeded the 15,000 population equivalents of additional coliform bacteria discharged to the tributaries along this reach.

Despite this reduction, the river still contained 37,000 coliforms per 100 ml, or seven times the water supply criteria, at Sampling Station 306.7, located less than one mile upstream from the West Point Municipal Water Works intake. Densities equalled or exceeded

160,000 MPN/100 ml 10 per cent of the time. A substantial portion of this residual bacterial load originated in Atlanta.

West Point sewage entered the river without treatment about one mile above the Lanett Municipal Water Works intake, and increased the coliform densities to 50,000 MPN/100 ml, or 10 times the water supply criteria, at the Georgia-Alabama State line station located below the sewers and only 0.2 miles above the water intake. Densities equalled or exceeded 130,000, 10 per cent of the time.

Lanett sewage increased the mean coliform content to 57,000 at the airport station located about 2.5 miles below the State line.

Within the next 13 miles, coliform die-off again exceeded the bacterial input from sewers within this reach. Though substantially reduced by natural purification, the residual 14,000 coliform density in upper Lake Harding was still 14 times the criteria for water contact recreational use. Coliform densities were further reduced during passage through Lake Harding and a later August-September 1965 survey showed 35 MPN/100 ml at the Bartletts Ferry Dam outlet.

At the Columbus Municipal Water Supply intake above Oliver Dam, the 800 MPN/100 ml total coliform density which included two per cent fecal coliforms, met the water supply criteria.

Untreated sewage from approximately 1,200 persons in north Columbus entered the river below Oliver Dam, and the mean total coliform density increased to 3,600 MPN/100 ml at the Phenix City Water Supply intake less than one mile downstream and across the river. Though the mean total coliform density, containing one per cent fecal coliforms, met the 5,000 MPN/100 ml water supply criteria, the maximum coliform densities, including eight per cent fecal coliforms, equalled or exceeded 20,000, 10 per cent of the time.

Raw and treated sewage from Colubus and treated sewage from Phenix City, which contained no chlorination or inadequate chlorination at the time, entered the next five-mile reach of the river adjoining these two cities.

The mean total coliform density vastly exceeded allwater use quality criteria as it increased sharply to 490,000 MPN/100 ml, in the impounded river channel located three miles below the Columbus sewage treatment plant outfall. Thirty-seven per cent of these were fecal coliforms.

Though total coliform densities were successively reduced at each downstream station in the next 50 miles of Walter F. George Reservoir, water along 35 of these miles, from Columbus to Florence Landing, exceeded the 1,000 MPN/100 ml criteria for water contact recreation. The relatively low coliform content in Fort Benning's treated sewage and the slope of the coliform form die-off curve show that Columbus and Phenix City sewages are primarily responsible for bacterial pollution of this reach.

After reaching a low of 250 MPN/100 ml, the mean total coliform density increased to 740 and the maximum exceeded 20,000, 10 per cent of the time at Eufaula. Fecal coliform bacteria also increased about threefold at this location. Bacterial pollution of this localized area of the reservoir is attributed to untreated sewage from Eufaula.

Bacterial water quality in the lower 20 miles of reservoir, from below Eufaula to the Walter F. George Lock and Dam, was excellent. A mean total coliform content of 8 MPN/100 ml was observed halfway down the reach.

Salmonella Bacteria

In addition to routine coliform analyses, special *Salmonella* bacteria detection studies were conducted at certain locations in the Columbus-Walter F. George Reservoir area during the June-July 1965 survey.

While coliform densities indicate the magnitude of fecal pollution which may contain disease-producing organisms, detection of pathogenic *Salmonella* bacteria in river water is positive proof that these infectious disease-producing organisms are actually present.

Salmonellosis, the disease caused by various species of *Salmonella* bacteria, includes typhoid fever, gastroenteritis and diarrhea. There are more than 900 known serological species of *Salmonella*. Table 9 lists the seven species which infected man most frequently in the United States during June 1965. Six of these seven, namely, *S. typhi-murium*, *S. typhi-murium* var. *copenhagen*, *S. heidelberg*, *S. infantis*, *S. newport*, and *S. saint-paul*, were isolated from the Chattahoochee River during the June-July 1965 survey.

All five modified Moore swab samples retrieved from the Chattahoochee River, and two of the four samples retrieved from sewage treatment plant outfalls, contained *Salmonella* bacteria. Results are shown in Table 10.

Salmonella montevideo and *S. muenchen* were found in the river at the Columbus Water Supply intake, and *Salmonella heidelberg* was found at the Phenix City Water Supply intake. The presence of pathogenic organisms in these waters, which on the average met the coliform criteria for water supplies, emphasizes the need for adequate pollution abatement, and reaffirms the absolute necessity for continuous, thoroughly effective water treatment which can remove *Salmonella* and other pathogenic bacteria.

Salmonella bacteria were found in Chattahoochee River water samples collected above Upatoi Creek, at River Bend Park and at Florence Landing. This confirmation of the coliform findings showed that pathogenic bacteria from fecal pollution persisted for more than 35 miles downstream from Columbus.

At Fort Benning's first and second sewage treatment plants, the final effluents were disinfected with chlorine. Salmonella organisms were not recovered from the swab samples from these two effluents which contained mean coliform densities of 300 and 1,500 MPN/100 ml, respectively. Neither primary treatment at Columbus, nor secondary treatment at Phenix City removed the pathogens from sewage. The Columbus treatment plant effluent contained S. typhi-murium var. copenhagen and S. derby, and the Phenix City Treatment Plant effluent contained S. newport.

Danger to Health

Sewage from 883,000 persons entered the Chattahoochee River. Most of this sewage received primary, but not secondary, treatment. Less than 10 per cent was disinfected, and less than half of the coliform bacteria were removed by treatment.

Mean coliform densities in river water pumped to the La Grange, West Point, and Lanett municipal water treatment plants exceeded the 5,000 MPN/100 ml criteria for water supply sources. Though mean coliform density criteria were met, river water supplies for the Columbus and Phenix City water treatment plants contained pathogenic Salmonella bacteria.

Coliform densities greatly exceeded the bacterial water quality criteria for swimming, skiing, fishing, boating, and general recreational use along the entire 100-mile reach from Atlanta to upper Lake Harding. These criteria were also exceeded, and pathogenic Salmonella bacteria were found, in more than 35 miles of the river from Columbus into upper Walter F. George Reservoir.

Bacterial pollution endangered the health of persons contacting Chattahoochee River water along more than 135 miles of local and interstate waters in Georgia and Alabama.

CHAIRMAN STEIN: Mr. West, on this antiseptic note, I think we will recess for ten minutes.

(Whereupon, a recess was taken.)

CHAIRMAN STEIN: May we get started, please?

Mr. West.

MR. WEST: Thank you, Mr. Chairman. I will continue the discussion of the dissolved oxygen content of the Chattahoochee River and the impoundments as observed during the surveys.

DISSOLVED OXYGEN

The Georgia Water Quality Control Board Rule No. 3, Standards of Water Purity, specifies that . . . "The dissolved oxygen content of the waters shall not be depleted to an extent that will interfere unduly with the reasonable and necessary uses of water. . . ." Though State-wide dissolved oxygen standards have not been established, the Alabama Water Improvement Commission has, in individual cases, specified a minimum dissolved concentration of 4.0 mg/l for protection of fish and aquatic life. To meet water quality objectives for fish and aquatic life, the dissolved oxygen content of the Chattahoochee River should be maintained at least above 4.0 mg/l at all times.

Atmospheric oxygen is supplied to waters by natural reaeration at rates which are greatest in swiftly flowing turbulent streams, moderate in slowly-moving deep rivers, and minimal in still water. Oxygen is removed from water by the biochemical demand of constituents in sewage and industrial wastes. Though the pollutional strength of such constituents is conventionally measured by the amount of oxygen they remove in five days -- you have heard us talk about the five-day BOD test, and basically you set up a bottle of water and see how much oxygen the pollutants remove in five days -- they continue to use oxygen over a much longer period of time, sometimes a month or more, before their demands are fully satisfied.

The dissolved oxygen content of a flowing stream receiving wastes from a single source, for example, will be progressively reduced at successive downstream locations as long as the oxygen demand of the wastes exceeds the reaeration capacity of the flowing stream. DO concentrations may continue to fall throughout one or more days' flow time into the critical reach where minimum DO's occur and where the oxygen supply and demand reaches equilibrium.

Downstream from this critical reach, the amount of oxygen supplied to the river by reaeration will exceed the reduced residual oxygen demand of the partially stabilized wastes and in this area the stream will start to recover.

Additional phenomena occur in reservoirs where velocities approach zero, turbulent mixing subsides, depths increase, stratification occurs, and waters are impounded for months, or even seasons, before being released once again as free-flowing streams.

Residual unoxidized materials that are carried along in the flowing river are retained and exert their total long-term oxygen demand during residence in the reservoir. Though surface waters are oxygenated, stratification minimizes vertical mixing, and little, if any, additional atmospheric oxygen penetrates the depths to replace that being used by decomposition of residual unstable waste materials, and natural plant and animal cells. As a result, the deeper waters may contain little or no dissolved oxygen. Where such oxygen deficient waters are released through hydroelectric generators, drawing water from the depths behind the dam, the lower river may also be devoid of oxygen and may not recover for many miles downstream.

The dissolved oxygen content of the Chattahoochee River from Franklin to Lake Harding, during October-November 1964 is shown in Table 11.

The 1964 survey, which did not include DO studies along the first 65-mile reach below Atlanta, revealed satisfactory dissolved oxygen concentration in the river from Franklin, Georgia, to Lake Harding and in the surface waters of Lake Harding.

During a previous August 1963 survey, which included the Atlanta area, the Georgia Department of Public Health observed a series of DO's consistently below 4.0, with a minimum of 2.1 mg/l, in the reach extending 20 to 40 miles below Atlanta (from Georgia Highway 92 to Whitesburg). Degradation of this reach in Georgia was caused by sewage and industrial wastes from the Atlanta metropolitan area.

Eleven samples collected near the bottom of Lake Harding at Bartletts Ferry Dam during a later August-September 1965 survey contained no dissolved oxygen.

The dissolved oxygen content of the Chattahoochee River was satisfactory in the flowing reaches downstream from Columbus and in the surface waters of the Walter F. George Reservoir, but was reduced below 4.0 mg/l in the deep reservoir waters and in the river below the dam at Fort Gaines.

As shown in Figure 5, six to seven mg/l of DO were present in the flowing channelized reach of the Walter F. George impoundment from the Fort Benning Bridge to River Bend Park. As the channel deepened, velocities decreased, and thermal stratification (shown in Figure 6) became evident in the next 20 miles to Florence Landing, where DO's ranged from 8.0 mg/l at the surface to 4.7 mg/l at a 40-foot bottom depth.

Stratification became more pronounced and the dissolved oxygen content of the deeper waters was reduced below 4.0 mg/l in the next 20-mile reach to Eufaula. From Eufaula to the dam, the DO ranged from about 8.0 mg/l at the surface to about 4.0 mg/l at 15 to 20-foot depths, but was progressively reduced below 4.0 mg/l to less than 1.0 mg/l in the deeper reservoir waters.

Oxygen deficient water, drawn from the depths of the reservoir and released through the power generators at the Walter F. George dam, returns to the Chattahoochee River channel as a free-flowing river above Fort Gaines, Georgia. During a May-June 1965 survey, the dissolved oxygen content of the river water averaged 3.8 mg/l, was less than 3.0 in six of the 14 samples, and sagged to a minimum of 0.8 mg/l at the Fort Gaines bridge, two miles below the dam.

(Figures 5 and 6, above referred to, follow:)

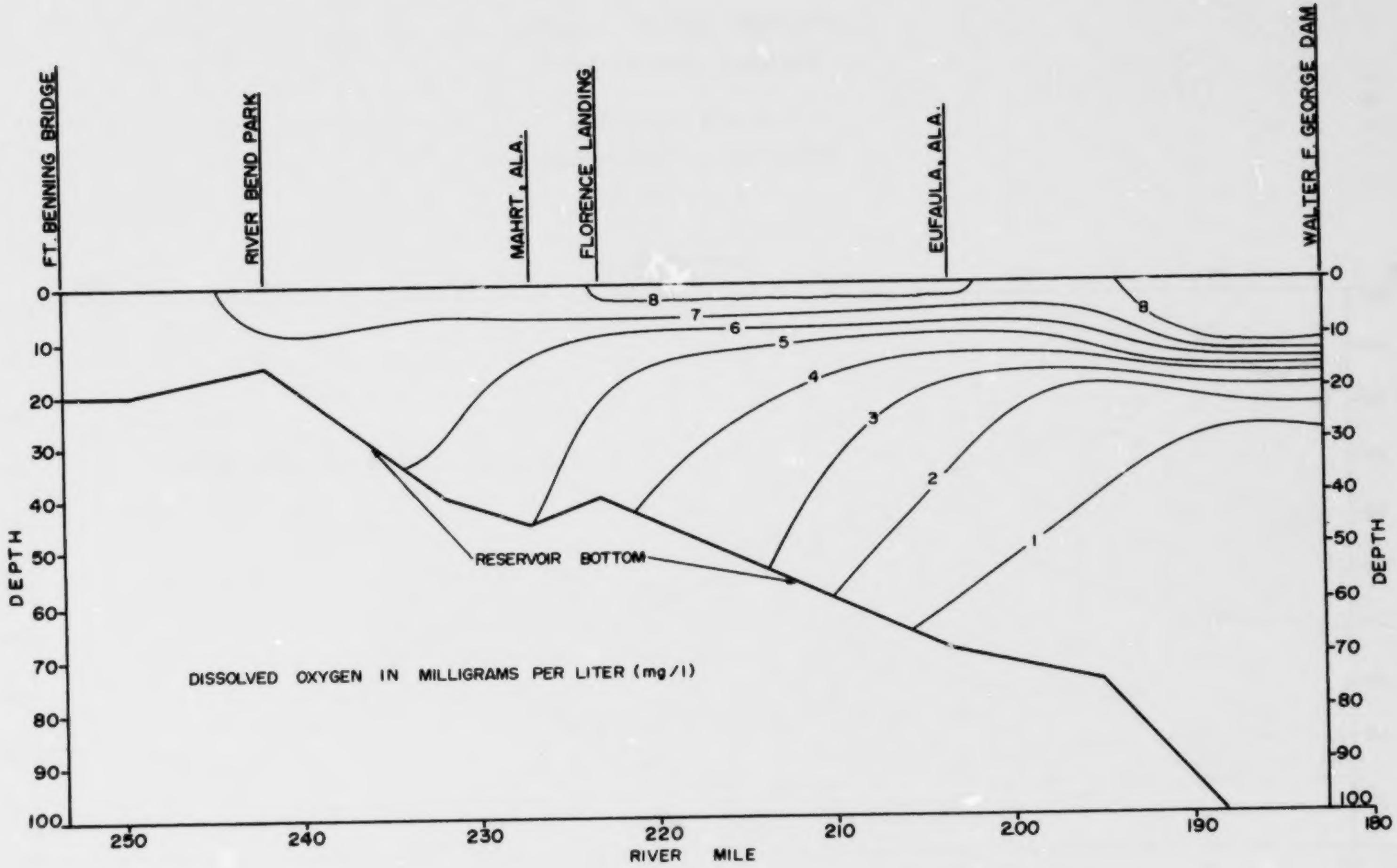


FIGURE 5

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA — GEORGIA

DISSOLVED OXYGEN PROFILE

WALTER F. GEORGE RESERVOIR

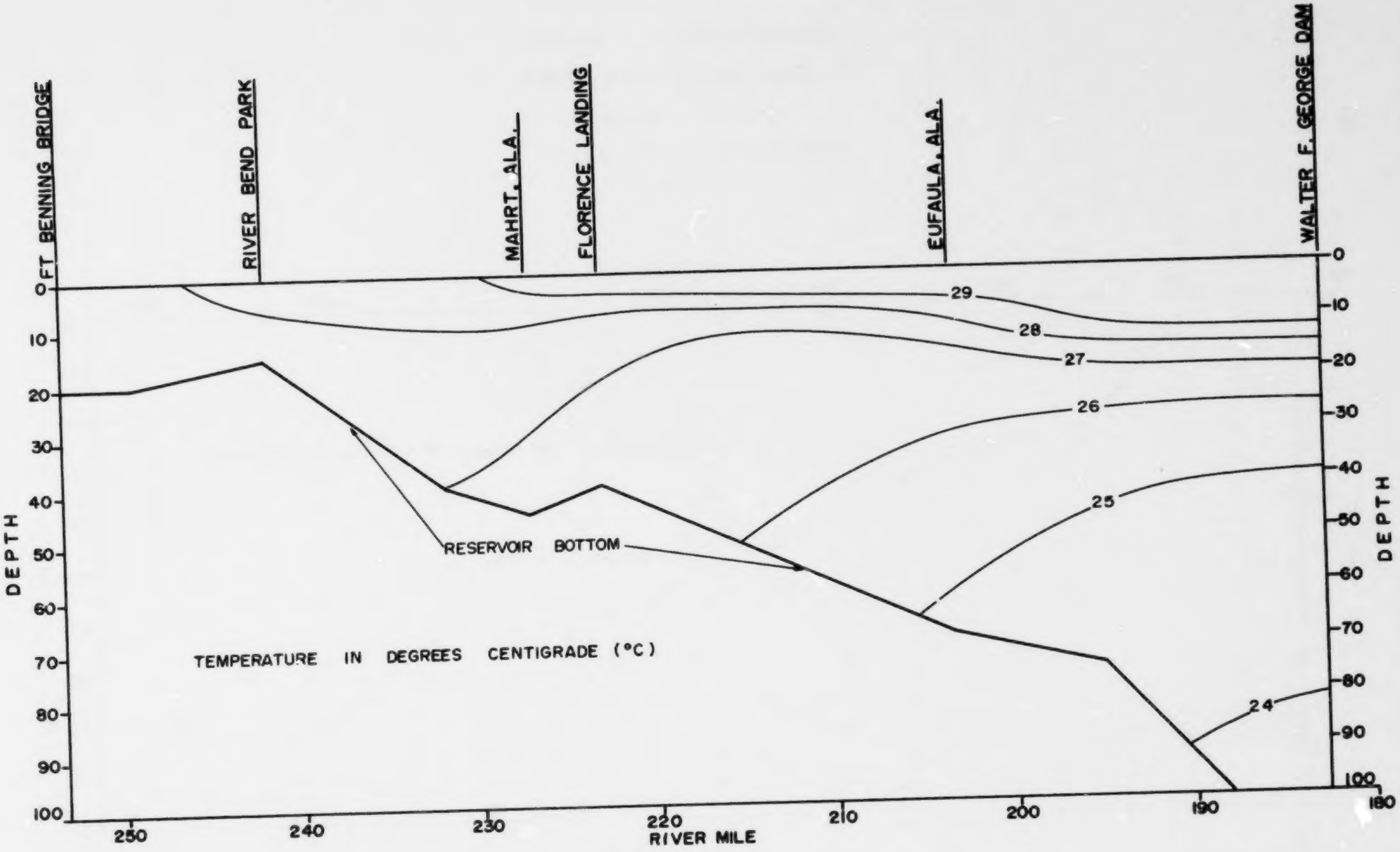


FIGURE 6

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA — GEORGIA

TEMPERATURE PROFILE

WALTER F. GEORGE RESERVOIR

TIME OF PASSAGE STUDIES

Results of the two studies conducted to determine time of passage in the Chattahoochee River from Columbus-Phenix City to River Bend Park are shown on Figure 7. In each case, dye was released in the urban Columbus-Phenix City area and traced to River Bend Park, some 20 miles downstream.

The first batch of dye was released into the river when the Oliver Dam Hydro Plant was discharging 8,520 cfs through the turbines. This discharge was maintained for 12.5 hours after the dye release except for a 25-minute period during which the flow was increased to 12,160 cfs. At the end of this 12.5-hour period, the discharge was reduced to 1,240 cfs. Under these conditions the river velocity decreased steadily from 50 miles/day near the Phenix City and Columbus sewage treatment plants, to 3 miles/day at the upstream end of River Bend Park. Approximately 1.2 days were required for passage through the 20-mile reach from the Columbus Sewage Treatment Plant (R.M. 261.9) to River Bend Park (R.M. 241.8).

A second batch of dye was released at a time when the Oliver Dam Hydro Plant was discharging a minimum flow of 1,240 cfs. This flow was maintained for approximately six hours after the dye release. Flows then increased in steps over a three-hour period, to a maximum of 8,520 cfs.

This maximum flow was maintained for approximately nine hours, and then reduced in steps over a period of three hours to the minimum of 1,240 cfs.

During this second study, the initial river velocity at the Phenix City and Columbus sewage treatment plants was about 10 miles/day. As flows increased, velocity also increased to about 40 miles/day at the General Eddy Bridge (R.M. 253.3), and then decreased to about three miles per day at River Bend Park (R.M. 241.8). Approximately the same total time (1.2 days) was required for passage from the Columbus Sewage Treatment Plant to River Bend Park for each of the two flow conditions; however, the velocity patterns between these two points were almost exactly reversed.

(Figure 7, above referred to, follows:)

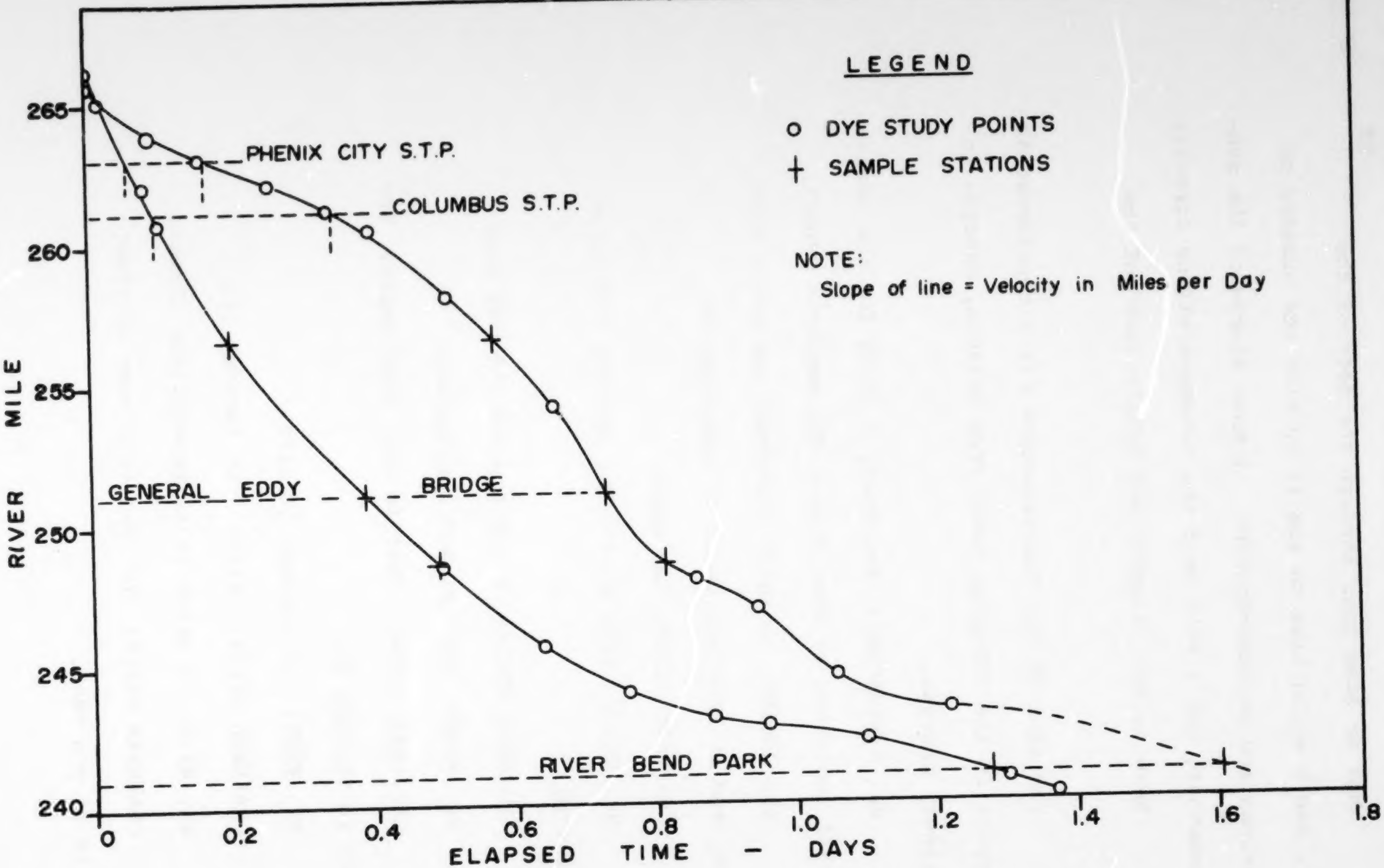


FIGURE 7

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA - GEORGIA

TIME OF PASSAGE

Now we have gone through the body of the report, and I would like to sum it up with the summary on conclusions and recommendations. I have shortened the summary somewhat, but I will read the recommendations directly.

Here is the "Summary and Conclusions" of the survey.

The area of the Chattahoochee River considered in this report is the 225-mile reach from Atlanta, Georgia to Fort Gaines, Georgia.

MR. RADEMACHER: Mr. West, I think for the benefit of all concerned we should have the complete report.

MR. HOWARD: I think everybody has got a copy, Mr. West, and I think you ought to summarize it.

CHAIRMAN STEIN: Go ahead.

MR. WEST: With what? The reduced version or the verbatim?

CHAIRMAN STEIN: Where are you reading now?

MR. WEST: Summary and conclusions.

CHAIRMAN STEIN: That is only four pages. Why don't you go through it?

MR. WEST: Go through it all?

CHAIRMAN STEIN: Right. Go through it.

MR. WEST: I think it is repetitious though.

CHAIRMAN STEIN: You can skip some of those statements if you want.

MR. HOWARD: Let's do that.

MR. WEST: Okay. Here we go.

SUMMARY AND CONCLUSIONS

The Chattahoochee River, which sustains social, economic and industrial growth and development in Georgia and Alabama, is used extensively for domestic and industrial water supply, production of hydro-electric power, and water-oriented sports recreation.

Treated and untreated sewage from 26 cities, untreated wastes from nine separate industries, and heat from three steam-electric generating plants were discharged into the river within the 225-mile reach between Atlanta and Fort Gaines.

Atlanta, Georgia, the largest source of sewage, discharged more than half of the total bacterial and oxygen-demanding loads to the river. Untreated sewage bypassed the Clayton Treatment Plant about one-third of the time. After primary treatment, the effluent reaching the river contained 564,000 population equivalents of oxygen-demanding material and 282,000 population equivalents of sewage-associated bacteria.

Columbus, Georgia, the second-largest source of sewage, discharged 176,000 population equivalents of oxygen-demanding material (17 per cent of the total), and 150,000 population equivalents of sewage-associated bacteria (31 per cent of the total).

The remaining 26 Georgia and Alabama communities, described in the report, discharged 74,000 population equivalents of oxygen-demanding material (7 per cent of the total) and 44,000 population equivalents of sewage-associated bacteria (10 per cent of the total) to the watershed.

Untreated industrial wastes reaching the river contributed 225,000 population equivalents, or 22 per cent of the total oxygen demand load. The largest single industrial waste load, amounting to 79,000 P.E., was discharged by the Lanett Mill and Bleachery in Lanett, Alabama, and the second-largest single load, amounting to 48,700 P.E., was discharged by the Fairfax Mill of Lanett. A total of 98,000 additional population equivalents of oxygen-demanding wastes were discharged by the other seven industries listed in the report.

Pollution from sewage increased the total coliform bacterial density of river waters far above upper critical limits of 1,000 MPN/100 ml for water contact sports, such as swimming and skiing, and 5,000 MPN/100 ml for treated water supply sources, fishing, boating, and general recreation.

The following mean coliform densities were observed during the surveys:

MPN/100 ml	
2,000	Atlanta Water Supply Intakes
2,400,000	20 Miles Below Atlanta
37,000	West Point Water Supply Intake
50,000	Lanett Water Supply Intake
14,000	Upper Lake Harding
800	Columbus Water Supply Intake
3,600	Phenix City Water Supply
490,000	W.F. George Reservoir (3 Mi. below Columbus)
290,000	" " (12 " ")
80,000	" " (20 " ")
8,000	" " (30 " ")
1,800	" " (40 " ")
8	" " (70 " ")

During special studies in the Columbus-W.F. George Reservoir area, pathogenic Salmonella bacteria were detected in the river at the Columbus and Phenix City Municipal Water Supply Intakes and in more than 35 miles of the Walter F. George Reservoir below Columbus.

Bacterial pollution endangered the health of persons contacting Chattahoochee River water along more than 135 miles of local and interstate waters in Georgia and Alabama.

The oxygen-demanding constituents in sewage and industrial wastes lowered the dissolved oxygen content of the river water below the 4.0 mg/l minimum requirement for propagation of fish and aquatic life in the reach extending from 20 to 40 miles below Atlanta in Georgia.

The long-term biochemical oxygen demand of sewage and industrial waste constituents, decomposition of natural plant and animal cells, and stabilization of bottom vegetation removed dissolved oxygen from deep waters in impoundments.

The dissolved oxygen concentration was reduced to zero at the bottom outlet of Lake Harding. It was reduced to below 4.0 mg/l at depths of more than 20 feet in the main body of the Walter F. George Reservoir and approached zero in the deeper waters near the outlet. Dissolved oxygen concentrations averaged 3.8 mg/l and were reduced as low as 0.8 mg/l at the Fort Gaines bridge 2 miles below the outlet from the Walter F. George Lock and Dam.

Chattahoochee River water in the free-flowing interstate reach at West Point, in the flowing channelized reaches entering the reservoirs, and in the surface waters in the upper 15 to 20 feet of reservoir areas, contained adequate dissolved oxygen to support a well-balanced, warm-water, game fish population.

To protect and preserve the Chattahoochee River for present and future beneficial uses, pollution must be abated. Such action, in compliance with the rules and regulations of the Georgia and Alabama water pollution control agencies, should include secondary treatment of all industrial wastes, effective operation and control of all treatment works, and separation of combined sewers.

Sewage and industrial wastes discharged to the Chattahoochee in Georgia cause pollution of the waters in Georgia and Alabama and sewage and industrial wastes discharged to the Chattahoochee River in Alabama cause pollution of the waters in Alabama and Georgia. This pollution endangers the health or welfare of persons in a State other than that in which the discharges originate and, therefore, is subject to abatement under the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et seq.).

Then there is the next and final section on recommendations.

GENERAL RECOMMENDATIONS

The following general pollution abatement procedures are recommended to protect and preserve the Chattahoochee River for present and future beneficial use:

1. Cities and industries should pursue existing pollution abatement programs diligently and treat all sewage and industrial wastes effectively, according to

the requirements of the Georgia Water Quality and Control Board and the Alabama Water Improvement Commission. Compliance with the full intent of existing State water quality control policies will, in effect, accomplish the objectives of the following supplemental recommendations:

2. All domestic sewage should receive adequate secondary treatment with effective effluent disinfection, treatment works should be operated at maximum purification efficiencies, and total and fecal coliform bacteria analyses should be included among other essential control tests.

3. All pollutional materials in industrial wastes should be controlled to achieve removals equivalent to those which can be attained in secondary type sewage treatment plants. Domestic sewage originating in industrial plants should be discharged to municipal sanitary sewers or receive secondary treatment and disinfection at the plant.

4. Pollution by sewage included in combined storm and sanitary sewers should be abated. No new combined sewers should be constructed and sanitary sewage should be separated from existing combined sewers as soon as practicable.

(Appendices to the report, referred to in the report, follow:)

FIGURE A

DETAIL MAP ATLANTA & VICINITY

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA — GEORGIA

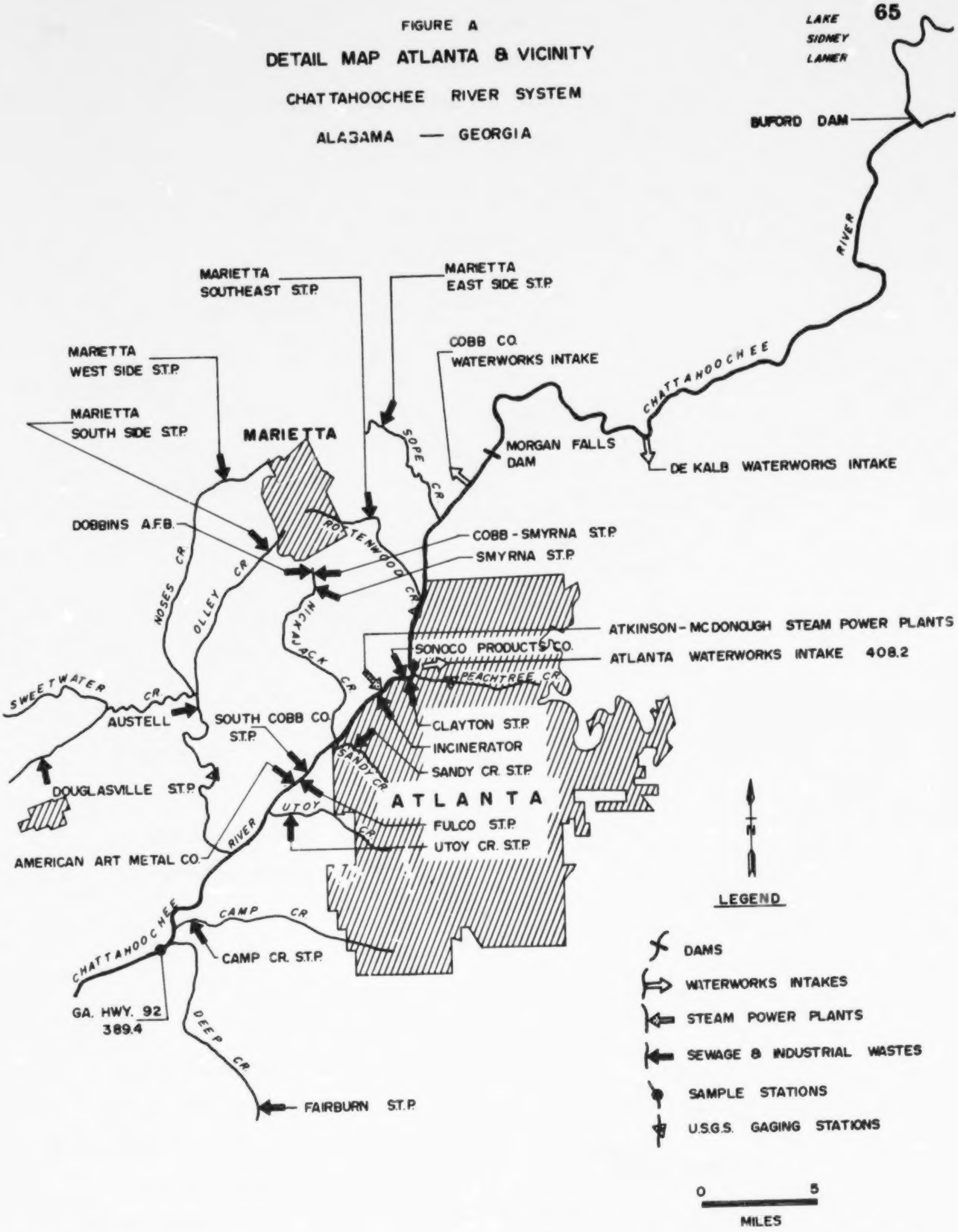

LAKE
SIDNEY
LANIER
BUFORD DAM
RIVER
CHATTAHOOCHEE
MARIETTA SOUTHEAST S.T.P.
MARIETTA EAST SIDE S.T.P.
COBB CO. WATERWORKS INTAKE
MARIETTA WEST SIDE S.T.P.
MARIETTA SOUTH SIDE S.T.P.
MARIETTA
SOPE CR.
MORGAN FALLS DAM
DE KALB WATERWORKS INTAKE
DOBBINS A.F.B.
ROTTENWOOD CR.
COBB - SMYRNA S.T.P.
SMYRNA S.T.P.
NOSES CR.
OLLEY CR.
NICKAJACK CR.
ATKINSON - MC DONOUGH STEAM POWER PLANTS
SONOCO PRODUCTS CO.
ATLANTA WATERWORKS INTAKE 408.2
PEACHTREE CR.
SWEETWATER CR.
AUSTELL
SOUTH COBB CO. S.T.P.
CLAYTON S.T.P.
INCINERATOR
SANDY CR.
SANDY CR. S.T.P.
DOUGLASVILLE S.T.P.
ATLANTA
UTOY CR.
FULCO S.T.P.
UTOY CR. S.T.P.
AMERICAN ART METAL CO.
RIVER
N
LEGEND
CAMP CR.
CHATTAHOOCHEE
CAMP CR. S.T.P.
GA. HWY. 92
389.4
DEEP CR.
FAIRBURN S.T.P.
DAMS
WATERWORKS INTAKES
STEAM POWER PLANTS
SEWAGE & INDUSTRIAL WASTES
SAMPLE STATIONS
U.S.G.S. GAGING STATIONS
0
5
MILES

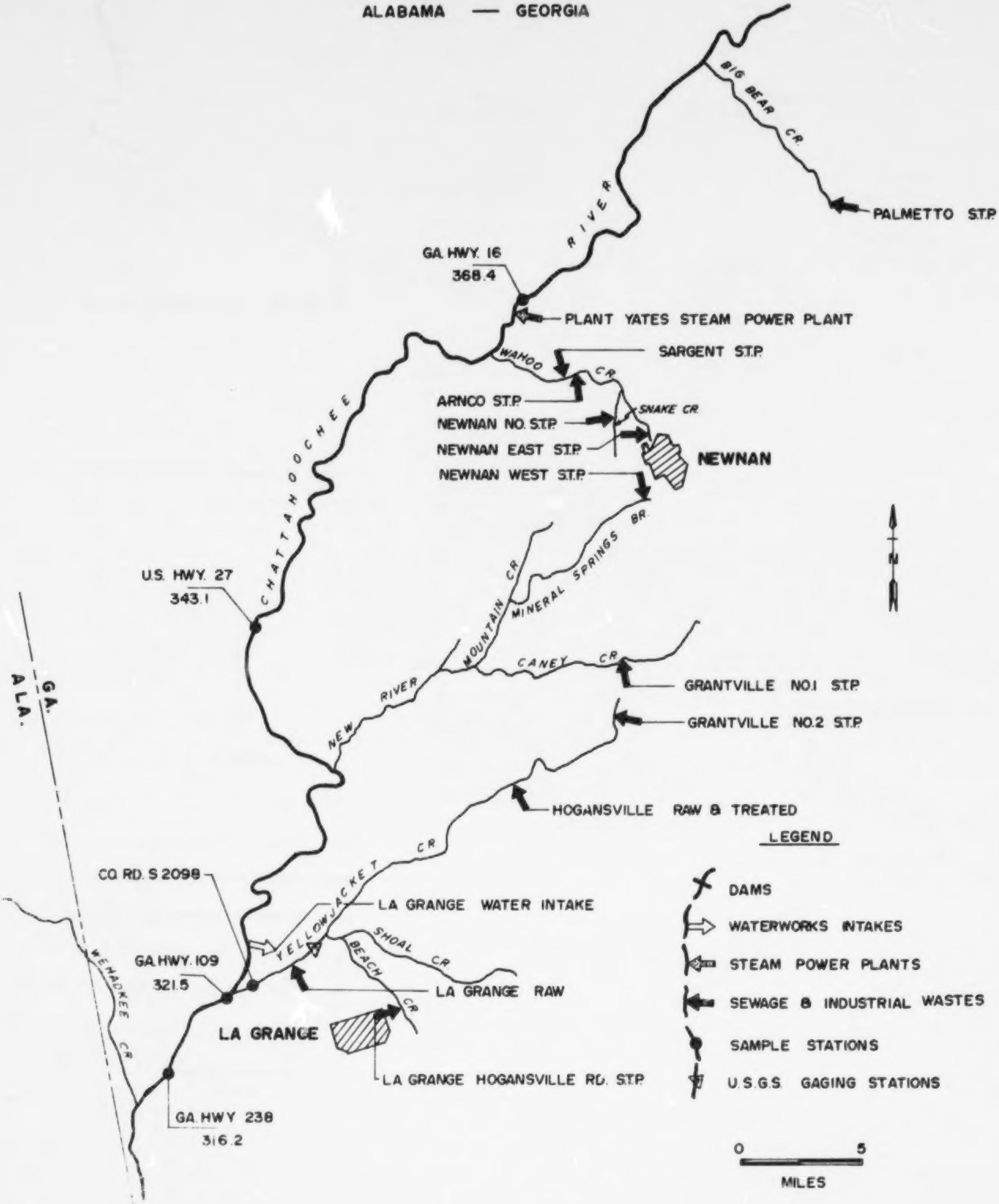
FIGURE B

DETAIL MAP

BELOW ATLANTA TO ABOVE WEST POINT

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA — GEORGIA


BIG BEAR CR.
PALMETTO S.T.P.
RIVER
GA. HWY. 16
368.4
PLANT YATES STEAM POWER PLANT
WAHOO CR.
SARGENT S.T.P.
ARNCO S.T.P.
SNAKE CR.
NEWNAN NO. S.T.P.
NEWNAN EAST S.T.P.
NEWNAN WEST S.T.P.
NEWNAN
CHATTAHOOCHEE
MINERAL SPRINGS BR.
MOUNTAIN CR.
N
U.S. HWY. 27
343.1
CANEY CR.
GRANTVILLE NO.1 S.T.P.
GRANTVILLE NO.2 S.T.P.
GA.
ALA.
NEW RIVER
HOGANSVILLE RAW & TREATED
YELLOWJACKET CR.
CO. RD. S 2098
LA GRANGE WATER INTAKE
SHOAL CR.
BEACH CR.
GA. HWY. 109
321.5
LA GRANGE RAW
LA GRANGE
LA GRANGE HOGANSVILLE RD. S.T.P.
WEHADKEE CR.
GA. HWY 238
316.2
LEGEND
DAMS
WATERWORKS INTAKES
STEAM POWER PLANTS
SEWAGE & INDUSTRIAL WASTES
SAMPLE STATIONS
U.S.G.S. GAGING STATIONS
0
5
MILES

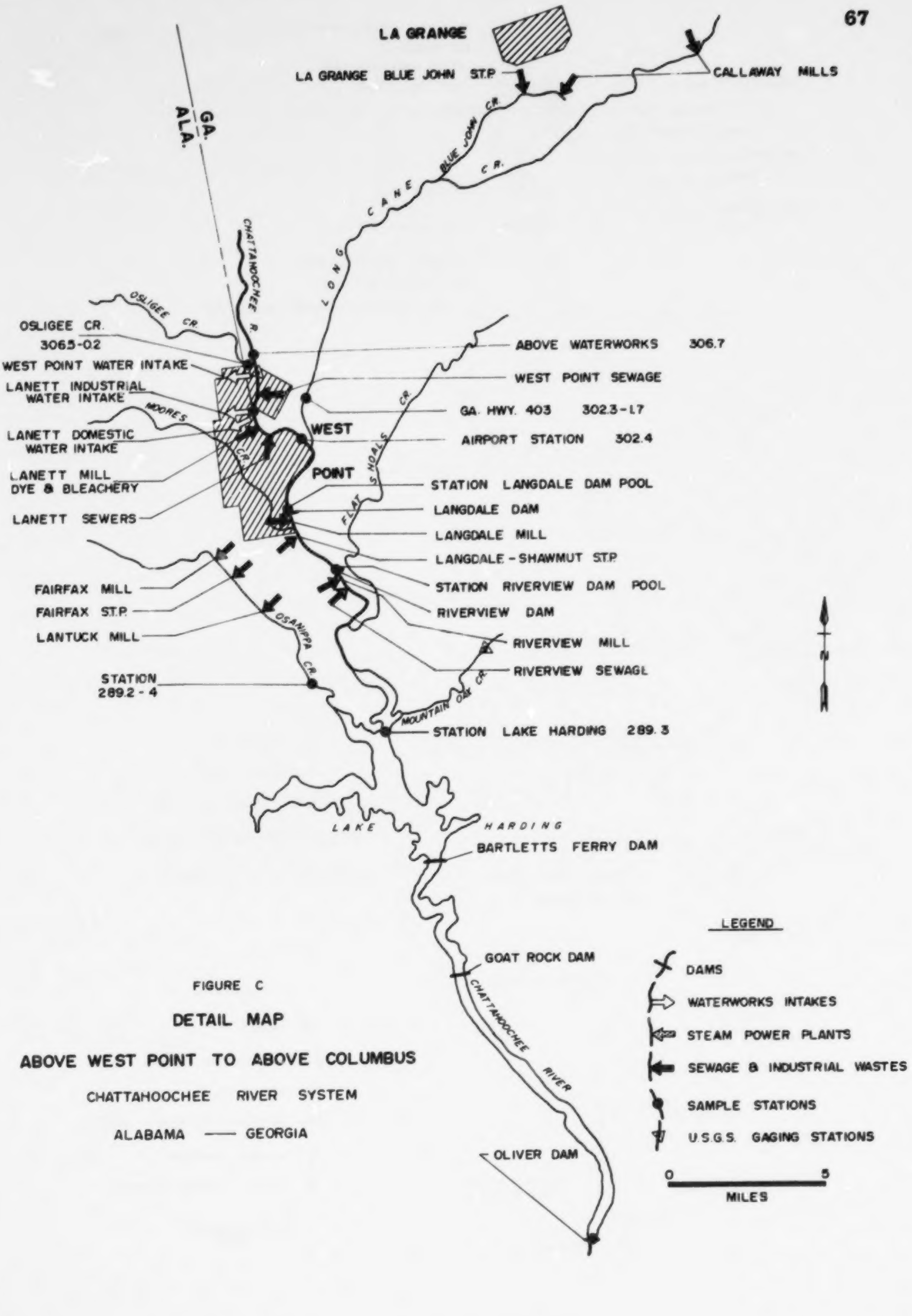

LA GRANGE
LA GRANGE BLUE JOHN ST.P.
CALLAWAY MILLS
GA.
ALA.
BLUE JOHN CR.
LONG CANE CR.
CHATTAHOOCHEE R.
OSLIGEE CR.
OSLIGEE CR.
3065-0.2
WEST POINT WATER INTAKE
LANETT INDUSTRIAL WATER INTAKE
MOORES CR.
LANETT DOMESTIC WATER INTAKE
LANETT MILL DYE & BLEACHERY
LANETT SEWERS
ABOVE WATERWORKS 306.7
WEST POINT SEWAGE
GA. HWY. 403 302.3-1.7
AIRPORT STATION 302.4
WEST POINT
FLAT SHOALS CR.
STATION LANGDALE DAM POOL
LANGDALE DAM
LANGDALE MILL
LANGDALE - SHAWMUT ST.P.
STATION RIVERVIEW DAM POOL
RIVERVIEW DAM
RIVERVIEW MILL
RIVERVIEW SEWAGE
FAIRFAX MILL
FAIRFAX ST.P.
LANTUCK MILL
OSANIPPA CR.
STATION 289.2 - 4
MOUNTAIN OAK CR.
STATION LAKE HARDING 289.3
N
LAKE HARDING
BARTLETTS FERRY DAM
GOAT ROCK DAM
CHATTAHOOCHEE RIVER
OLIVER DAM
LEGEND
DAMS
WATERWORKS INTAKES
STEAM POWER PLANTS
SEWAGE & INDUSTRIAL WASTES
SAMPLE STATIONS
U.S.G.S. GAGING STATIONS
0
5
MILES

FIGURE C

DETAIL MAP

ABOVE WEST POINT TO ABOVE COLUMBUS

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA —— GEORGIA

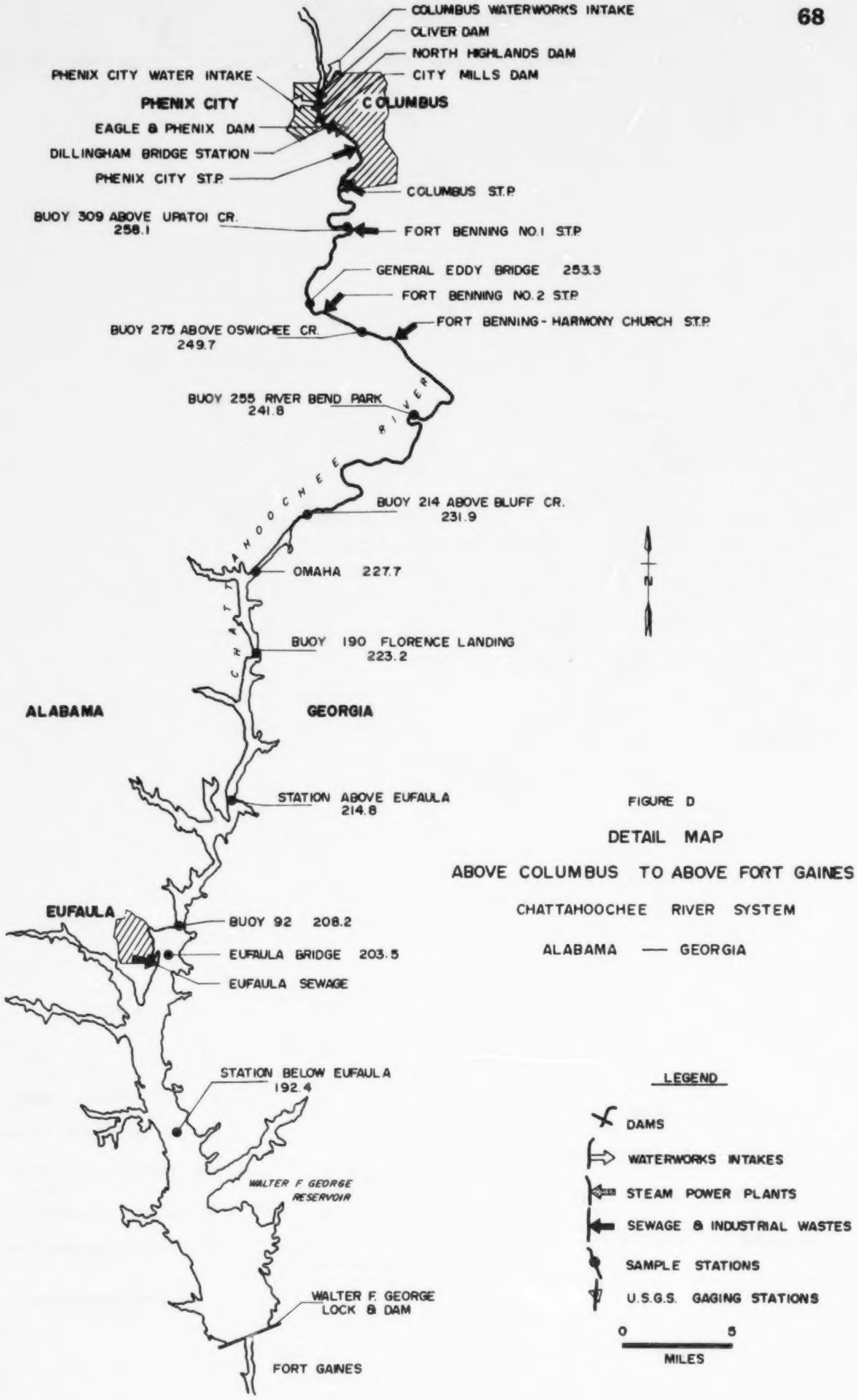

COLUMBUS WATERWORKS INTAKE
OLIVER DAM
NORTH HIGHLANDS DAM
CITY MILLS DAM
PHENIX CITY WATER INTAKE
PHENIX CITY
COLUMBUS
EAGLE & PHENIX DAM
DILLINGHAM BRIDGE STATION
PHENIX CITY S.T.P.
COLUMBUS S.T.P.
BUOY 309 ABOVE UPATOI CR. 258.1
FORT BENNING NO. 1 S.T.P.
GENERAL EDDY BRIDGE 253.3
FORT BENNING NO. 2 S.T.P.
BUOY 275 ABOVE OSWICHEE CR. 249.7
FORT BENNING - HARMONY CHURCH S.T.P.
BUOY 255 RIVER BEND PARK 241.8
CHATTAHOOCHEE RIVER
BUOY 214 ABOVE BLUFF CR. 231.9
OMAHA 227.7
N
BUOY 190 FLORENCE LANDING 223.2
ALABAMA
GEORGIA
STATION ABOVE EUFAULA 214.8
EUFAULA
BUOY 92 208.2
EUFAULA BRIDGE 203.5
EUFAULA SEWAGE
STATION BELOW EUFAULA 192.4
WALTER F GEORGE RESERVOIR
WALTER F. GEORGE LOCK & DAM
FORT GAINES
LEGEND
DAMS
WATERWORKS INTAKES
STEAM POWER PLANTS
SEWAGE & INDUSTRIAL WASTES
SAMPLE STATIONS
U.S.G.S. GAGING STATIONS
0
5
MILES

FIGURE D

DETAIL MAP

ABOVE COLUMBUS TO ABOVE FORT GAINES

CHATTAHOOCHEE RIVER SYSTEM

ALABAMA — GEORGIA

TABLE NO. 1

Reference Point Locations

Chattahoochee River

1964 & 1965 Surveys

Feature	River Mile
Sope Creek	416.1
Marietta East Side S. T. P.	416.1 - 6.3
Rottenwood Creek	412.1
Marietta Southeast S. T. P.	412.1 - 4.7
U.S.G.S. Gage No. 2-3360	410.6
Atlanta Water Works Intake (Sample Sta.)	408.2
Peachtree Creek	408.1
U.S.G.S. Gage No. 2-3363	408.1 - 4
Clayton S. T. P. (Atlanta)	408.0
Sonoco Products Co. (Atlanta)	407.3
Power Plants - Atkinson & McDonough	407.0
Atlanta Municipal Incinerator	406.6
Nickajack Creek	403.2
Dobbins A.F.B. S.T.P.	403.2 - 10.5
Cobb-Smyrna S.T.P.	403.2 - 10.0
Smyrna S.T.P.	403.2 - 9.0
Sandy Creek	403.1
Sandy Creek S.T.P. (Atlanta)	403.1 - 0.4
South Cobb Co. S.T.P.	401.3
Fulco S.T.P. (Atlanta)	400.6
American Art Metal Co. (Atlanta)	400.2

TABLE NO. 1a

Reference Point Locations

Chattahoochee River

1964 & 1965 Surveys

Feature	River Mile
Utoy Creek	399.0
Utoy Creek S.T.P. (Atlanta)	399.0 - 1.0
Sweetwater Creek	397.6
Douglasville S.T.P.	397.6 - 1.9
Noses Creek	397.6 - 9.1
Marietta West Side S.T.P.	397.6 - 9.1 - 11
Olley Creek	397.6 - 9
Marietta South Side S.T.P.	397.6 - 9 - 9
Austell	397.6 - 7
U.S.G.S. Gage No. 2-3370	397.6 - 5.5
Camp Creek	391.2
Camp Creek S.T.P. (Atlanta)	391.2 - 0.5
Deep Creek	390.7
Fairburn S.T.P.	390.7 - 6
Georgia Hwy. 92 (Sample Sta.)	389.4
Big Bear Creek	383.5
Palmetto S.T.P.	383.5 - 9
Georgia Hwy. 16 - Whitesburg (Sample Sta.)	368.4
Power Plant _ Yates	366.2

TABLE NO. 1b

Reference Point Locations

Chattahoochee River

1964 & 1965 Surveys

Feature	River Mile
Wahoo Creek	364.2
Newnan East S.T.P.	364.2 - 12
Snake Creek	364.2 - 7.5
Newnan North S.T.P.	364.2 - 7.5 - 1.4
Arnco Village S.T.P.	364.2 - 4.5
Sargent S.T.P.	364.2 - 4
U. S. Hwy. 27 - Franklin (Sample Sta.)	343.1
New River	334.1
Caney Creek	334.1 - 9
Grantville S.T.P. #1	334.1 - 9 - 7
Mountain Creek	334.1 - 9 - 1
Mineral Springs Branch	334.1 - 9 - 1 - 10
Newnan West S.T.P. #1	334.1 - 9 - 1 - 10 - 3
Ga. Hwy. 219 (Aug.1965 Sampling Sta.)	328.0
Yellowjacket Creek	321.9
Grantville #2	321.9 - 19
Hogansville S.T.P. & Raw Sewage	321.9 - 16
Aug. 1965 Sample Sta.	321.9 - 13.2
Shoal Creek	321.9 - 6
Beach Creek	321.9 - 6 - 1
La Grange Hogansville Rd. S.T.P.	321.9 - 6 - 1 - 3
U.S.G.S. Gage No. 2-3390	321.9 - 5.5

TABLE NO. 1c

Reference Point Locations

Chattahoochee River

1964 & 1965 Surveys

Feature	River Mile
La Grange (Raw)	321.9 - 3.6
Co. Rd. S 2098 (Sample Sta.)	321.9 - 1.3
Georgia Hwy. 109 - nr. La Grange (Aug.'65 Samp.Sta.)	321.5
Georgia Hwy. 238 - Nr. La Grange (Sample Sta.)	316.2
Wehadkee Creek	314.5
Guss Creek	314.5 - 10
West Point - above Water Works (Sample Sta.)	306.7
Osligee Creek	306.5
Kellem Hill Creek	306.5 - 8
Sampling Station	306.5 - 0.2
U.S.G.S. Gage No. 2-3395	306.4
West Point Water Intake (New)	306.4
West Point Sewage (Raw)	306.3 to 305.3
State Line	305.2
Lanett Industrial Water Supply	305.1
Lanett Domestic Water Supply (Sample Sta.)	304.9
Lanett Mill, Dye & Bleachery (Lanett)	304.9
Lanett Sewers (Raw Dom. & Ind. W.)	304.5
Airport (Sample Sta.)	302.4
Near Airport (Aug.'65 Sample Sta.)	302.35

TABLE NO. 1d

Reference Point Locations

Chattahoochee River

1964 & 1965 Surveys

Feature	River Mile
Long Cane Creek	302.3
Callaway Mill (La Grange)	302.3 - 21
Blue John Creek	302.3 - 11
Callaway Mill	302.3 - 11 - 5
La Grange Blue John S.T.P.	302.3 - 11 - 4
Georgia Hwy. #403 (Sample Sta.)	302.3 - 1.7
Langdale Dam (Sample Sta. in the pool)	300.0
Langdale Mill	300.0
Langdale - Shawmut S.T.P.	299.9
Flat Shoals Creek	296.5
Turkey Creek	296.5 - 20.5
Riverview Dam (Sample Sta. in the pool)	296.2
Riverview Mill	296.2
Riverview Sewage	296.1
Mountain Oak Creek	289.6
U.S.G.S. Gage No. 2-3405	289.6 - 5
Lake Harding (Sample Sta.)	289.3
Osanippa Creek	289.2
Fairfax Mill (Lanett)	289.2 - 8.25
Fairfax S.T.P.	289.2 - 8
Lantuck Mill (Lanett)	289.2 - 5.5
Co. Rd. (Sample Sta.)	289.2 - 4

TABLE NO. 1e

Reference Point Locations

Chattahoochee River

1964 & 1965 Surveys

Feature	River Mile
Lake Harding above Dam (Aug. '65 Sample Sta.)	285.8
Bartletts Ferry Dam	285.6
Goat Rock Dam	279.8
Oliver Dam (Sample Sta.)	270.5
Columbus Sanitary & I. W. Sewers	269.9 to 260.8
Phenix W. W. Intake (Sample Sta.)	269.4
North Highlands Dam	269.2
City Mills Dam	268.5
Eagle & Phenix Dam	267.7
Dillingham Bridge (Sample Sta.)	267.7
U.S.G.S. Gage No. 2-3415	267.2
Phenix City S. T. P.	264.3
Columbus S.T.P.	261.9
Buoy 309 above Upato Creek (Sample Sta.)	258.1
Fort Benning #1 S.T.P.	257.7
General Eddy Bridge (Sample Sta.)	253.3
Fort Benning #2 S.T.P.	252.7
Buoy 275 above Oswichee Creek (Sample Sta.)	249.7
Fort Benning - Harmony Church S.T.P.	248.7
Buoy 255 River Bend Park (Sample Sta.)	241.8

TABLE NO. 1f

Reference Point Locations

Chattahoochee River

1964 & 1965 Surveys

Feature	River Mile
Buoy 214 above Bluff Creek (Sample Sta.)	231.9
Omaha (Sample Sta.)	227.7
Buoy 190 Florence Landing (Sample Sta.)	223.2
Above Eufaula (Sample Sta.)	214.8
Buoy 92 above Eufaula (Sample Sta.)	208.2
Bridge at Eufaula (Sample Sta.)	203.5
Eufaula Outfall Sewer	203.2
Below Eufaula (Sample Sta.)	192.4
Walter F. George Lock & Dam	182.5

TABLE NO. 2

Domestic Water Supply Sources

Chattahoochee River
Buford, Ga. to Fort Gaines, Ala.

JURISDICTION	Location River Mile	Volume (Million Gallons Per Day) Average Day	Maximum Day
Gwinnett County	445.3	1.6	2.5
DeKalb County	432.8	25.9	44.6
Cobb County	418.0	14.2	20.3
Atlanta, Ga.	408.2	83.0	109.0
La Grange, Ga.	322.9	2.3	-
West Point, Ga.	306.4	0.6	-
Lanett, Ala.	304.9	2.0	3.5
Columbus, Ga.	270.5	18.0	35.0
Phenix City, Ala.	269.4	1.8	3.2
		149.4	

TABLE NO. 3

Electric Power Generation

Chattahoochee River
Buford, Ga. to Fort Gaines, Ala.

Power Plant	Power Company	Location River Mile	Generating Capacity (KW)	Cooling Wate	
				MGD	cfs
HYDRO POWER GENERATING PLANTS					
Buford	Corps of Engrs.	456.1	86,000	-	-
Morgan Falls	Ga. Power & Light	420.4	16,800	-	-
Langdale	Ga. Power & Light	300.0	1,040	-	-
Riverview	Ga. Power & Light	296.2	480	-	-
Bartlett's Ferry	Ga. Power & Light	285.6	65,000	-	-
Goat Rock	Ga. Power & Light	279.8	26,000	-	-
Oliver	Ga. Power & Light	270.5	60,000	-	-
North Highlands	Ga. Power & Light	269.2	30,000	-	-
Eagle Phenix	Eagle Phenix	267.7	4,100	-	-
Walter F. George	Corps of Engrs.	182.5	130,000	-	-
			419,420		
STEAM-ELECTRIC GENERATING PLANTS					
Atkinson	Ga. Power & Light	407.0	240,000	432	668
Jack McDonough	Ga. Power & Light	407.0	490,000	393	608
Yates	Ga. Power & Light	366.2	550,000	592	916
			1,280,000	1,417	2,192

TABLE NO. 4

SOURCES OF SEWAGE

Chattahoochee River and Tributaries

1964 Estimates

JURISDICTION	Type of Sewer System	TYPE OF TREATMENT	BACTERIAL LOADS				OXYGEN DEMAND LOADS			
			Severed Popula-tion	% Bact. Removed By Treat-ment	DISCHARGED TO WATERCOURSE		P.E. Before Treat-ment	% Removed By Treat-ment	DISCHARGED TO WATERCOURSE	
					BFE	% of Total			P.E.	% of Total
GEORGIA										
MARIETTA										
East Side	S	Secondary + CL. (H.R. Tr.F.)	15,000	99	150	-	15,000	80	3,000	0.4
South East	S	Secondary + CL. (Std. Tr.F.)	15,000	99	150	-	15,000	90	1,500	0.2
West Side	S	Secondary + CL. (Std. Tr.F.)	10,000	99	100	-	10,000	90	1,000	0.1
South Side	S	Secondary + CL. (Std. Tr.F.)	10,000	99	100	-	10,000	90	1,000	0.1
MARIETTA TOTAL			50,000	99	500	0.1	50,000	87	6,500	0.8
DOBBINS A.F. BASE	S	Secondary	12,000	90	1,200	0.3	12,000	85	1,800	0.2
COBB-SMYRNA	S	Secondary + CL. (Std. Tr.F.)	16,500	99	160	-	16,500	95	820	0.1
SMYRNA	S	Secondary + CL. (Std. Tr.F.)	5,000	95	250	-	5,000	60	2,000	0.2
SO. COBB COUNTY PL.		Secondary + CL. (Rated Aer.)	5,000	99	50	-	5,000	95	250	-
DOUGLASVILLE	S	Primary (Imhoff Tk.)	5,000	25	3,750	0.8	5,000	15	4,250	0.5
AUSTELL	S	Primary	1,250	50	620	0.1	1,250	33	830	0.1
COBB CO. SUBDIVISIONS	S	Secondary (Oxidation Ponds)	10,000	99	100	-	10,000	95	500	0.1
ATLANTA										
Clayton Pl.	S+C	Primary	396,330	40	238,000	50.0	760,000	32	520,000	63.8
Sandy Creek	S	Primary	8,570	50	4,300	0.9	9,000	40	5,400	0.7
Fulco	S	Primary	1,000	50	500	0.1	1,600	40	960	0.1
Utoy Creek	S+C	Primary	58,810	50	29,400	6.2	59,000	54	26,000	3.2
Camp Creek	S	Primary	20,390	50	10,200	2.1	20,000	40	12,000	1.5
ATLANTA TOTAL			485,100	42	282,400	59.3	849,600	34	564,360	69.3

TABLE NO. 4a(Contd.)

SOURCES OF SEWAGE

Chattahoochee River and Tributaries

1964 Estimates

JURISDICTION	Type of Sewer System	TYPE OF TREATMENT	BACTERIAL LOADS Sewered Popula-tion	BACTERIAL LOADS % Bact. Removed By Treat-ment	BACTERIAL LOADS DISCHARGED TO WATERCOURSE BPE	BACTERIAL LOADS DISCHARGED TO WATERCOURSE % of Total	OXYGEN DEMAND LOADS P.E. Before Treat-ment	OXYGEN DEMAND LOADS % Removed By Treat-ment	OXYGEN DEMAND LOADS DISCHARGED TO WATERCOURSE P.E.	OXYGEN DEMAND LOADS DISCHARGED TO WATERCOURSE % of Total
GEORGIA										
FAIRBURN	S	Secondary (Imhoff & Tr.Filter)	930	75	230	-	930	40	560	0.1
PALMETTO	S	Primary (Imhoff)	950	40	570	0.1	950	20	760	0.1
ARNCO	S	Primary (Septic Tk.)	800	25	600	0.1	800	10	720	0.1
NEWNAN										
East Plant	S	Secondary	3,000	90	300	0.1	3,000	80	600	0.1
North Plant	S	Secondary	2,000	90	200	-	2,500	80	500	0.1
West Plant	S	Secondary	2,500	90	250	0.1	1,750	81	330	-
NEWNAN TOTAL			7,500	90	750	0.2	7,250	80	1,430	0.2
SARGENT	S	Primary	1,500	50	750	0.2	800	38	500	0.1
GRANTVILLE										
Plant No. 1	S	Primary (Septic Tk.)	750	25	560	0.1	750	10	680	0.1
Plant No. 2	S	Primary (Septic Tk.)	450	25	340	0.1	450	10	400	-
GRANTVILLE TOTAL			1,200	25	900	0.2	1,200	10	1,080	0.1
HOGANSVILLE										
Raw Sewage	S	None	3,000	0	3,000	0.6	3,000	0	3,000	0.3
Septic Tank	S	Primary (Septic Tk.)	500	25	380	0.1	500	10	450	0.1
HOGANSVILLE TOTAL			3,500	3	3,380	0.7	3,500	2	3,450	0.4
LA GRANGE										
Hogansville Rd. Stp.		Secondary	1,000	90	100	-	1,000	90	100	-
Raw Sewage	S	None	6,000	0	6,000	1.3	6,000	0	6,000	0.8
Blue John Stp.	S	Secondary	20,000	90	2,000	0.4	20,000	90	2,000	0.2
LA GRANGE TOTAL			27,000	70	8,100	1.7	27,000	70	8,100	1.0

TABLE NO. 4b (Contd.)

SOURCES OF SEWAGE

Chattahoochee River and Tributaries

1964 Estimates

JURISDICTION	Type of Sewer System	TYPE OF TREATMENT	BACTERIAL LOADS				OXYGEN DEMAND LOADS			
			Sewered Population	% Bact. Removed By Treatment	DISCHARGED TO WATERCOURSE		P.E. Before Treatment	% Removed By Treatment	DISCHARGED TO WATERCOURSE	
					BPE	% of Total			P.E.	% of Total
GEORGIA										
WEST POINT	S&C	None	3,900	0	3,900	0.8	3,900	0	3,900	0.5
COLUMBUS										
Raw Sewage	S&C	None	118,000	0	118,000	24.8	(2)158,000	0	158,000	19.4
Treatment Plant(1)	S&C	Primary	32,000	0	32,000	6.7	32,000	41	18,000	2.2
COLUMBUS TOTAL			150,000	0	150,000	31.5	190,000	7	176,000	21.6
FORT BENNING(1)										
Plant No. 1	S	Primary + Cl_2	19,600	99.99	1	-	19,600	51	9,600	1.2
Plant No. 2	S	Primary + Cl_2	16,400	99.99	2	-	16,400	54	7,500	0.9
Harmony Church Plant (3)	S	Secondary (Act. Sl.+Pond)	14,700	99.99	2	-	14,700	97	420	0.1
FORT BENNING TOTAL			50,700	99.99	5	-	50,700	65	17,520	2.2
SUBTOTAL - STATE OF GEORGIA			837,830	45	458,215	96.1	1,241,380	34	795,330	97.7

TABLE NO. 4c (Contd.)

SOURCES OF SEWAGE

Chattahoochee River and Tributaries

1964 Estimates

JURISDICTION	Type of Sewer System	TYPE OF TREATMENT	BACTERIAL LOADS				OXYGEN DEMAND LOADS			
			Severed Population	% Bact. Removed By Treatment	DISCHARGED TO WATERCOURSE		P.E. Before Treatment	% Removed By Treatment	DISCHARGED TO WATERCOURSE	
					BPE	% of Total			P.E.	% of Total
ALABAMA										
LANETT(1)	S	None	4,320	0	4,320	0.9	4,320	0	4,320	0.5
LANGDALE-SHAWMUT(1)	S	None	1,190	0	1,190	0.2	1,190	0	1,190	0.1
RIVERVIEW(1)	S	None	280	0	280	0.1	280	0	280	0.1
FAIRFAX(1)	S	Primary (Imhoff Tk.)	870	0	870	0.2	870+	0	870	0.1
PHENIX CITY(1)	S	Secondary + CL.(Tr.Filter)	28,700	94	1,770	0.4	28,700	92	2,300	0.3
EUFAULA	S	None	10,000	0	10,000	2.1	10,000	0	10,000	1.2
SUBTOTAL - STATE OF ALABAMA			45,360	59	18,430	3.9	45,360	58	18,960	2.3
TOTAL - GEORGIA & ALABAMA			883,190	46	476,645	100.0	1,286,740	37	814,290	100.0

(1) Loads and removals based on plant records, survey tests, etc.

(2) Includes estimated 40,000 PE industrial waste in the 4.0 MGD industrial waste flow entering municipal sewers. Total Est. Sewage Flow = 22.0 MGD.

(3) Activated sludge plant effluent contains 1,700 PE of 5-day BOD. Assume 75% additional treatment in existing pond; - equals 420 PE remaining.

General Notes:

Type of Sewer systems are identified by the following symbols: S = Separate Sanitary Sewers; C = Combined Sanitary and Storm Sewers.

BPE = Bacterial Population Equivalent, i.e., 1,000 BPE represents the number of total coliform bacteria normally present in raw sewage from a 1,000 population community.

PE = Oxygen Demand Population Equivalent, i.e., 1.0 PE = 0.167 pounds of 5-day BOD.

ESTIMATED BACTERIAL REMOVALS:
50% Removal By Primary Plants, without chlorination
90% Removal By Secondary Plants, without chlorination
99% Removal By Secondary Plants with chlorination
(Above percentages reduced for overloaded plants)

ESTIMATED REMOVAL OF 5-DAY BOD - OXYGEN DEMAND LOADS:
33% Removal By Primary Plants
80% Removal By High Rate Trickling Filters
90% Removal By STD. Rate Trickling Filters
95% Removal By Activated Sludge
(Above estimates adjusted up or down for under or overloaded plants)

TABLE NO. 5

Sewage & Industrial Waste Loads
(Discharged to the Water Course)
Chattahoochee River & Tributaries
1964 Estimates

	Bacterial Load		Oxygen Demand	
	BPE	% of Total	PE	% of Total
		GEORGIA		
Sewage				
Marietta	500	0.1	6,500	0.6
Dobbins A.F.B.	1,200	0.3	1,800	0.2
Cobb-Smyrna	160	-	820	0.1
Smyrna	250	-	2,000	0.2
So. Cobb Co.	50	-	250	-
Douglasville	3,750	0.8	4,250	0.4
Austell	620	0.1	830	0.1
Cobb Co. Subdiv.	100	-	500	-
Atlanta	282,400	59.3	564,360	54.3
Fairburn	230	-	560	-
Palmetto	570	0.1	760	0.1
Newman	750	0.2	1,430	0.1
Arnco	600	0.1	720	0.1
Sargent	750	0.2	500	-
Grantville	900	0.2	1,080	0.1
Hogansville	3,380	0.7	3,450	0.3
La Grange	8,100	1.7	8,100	0.8
West Point	3,900	0.8	3,900	0.4
Columbus	150,000	31.5	176,000	16.9
Ft. Benning	5	-	17,520	1.7
Subtotal Sew.	458,215	96.1	795,330	76.4
Industrial Waste				
Sonoco Products, Atlanta, Ga.			20,000	1.9
Municipal Incinerator, Atlanta, Ga.			5,200	0.5
Callaway Mills, La Grange, Ga.			24,000	2.3
Muskogee Mill, Columbus, Ga.			16,000	1.6
West Point Mfg., Columbus, Ga.			16,000	1.6
Reeves Bros., Columbus, Ga.			16,000	1.6
Subtotal Ind.Waste			97,200	9.5
TOTAL - Georgia Sewage & Ind. Waste			892,530	85.9

TABLE NO. 5a

Sewage & Industrial Waste Loads
(Discharged to the Water Course)
Chattahoochee River & Tributaries
1964 Estimates

	Bacterial Load		Oxygen Demand	
	BPE	% of Total	PE	% of Total
ALABAMA				
Sewage				
Lanett	4,320	0.9	4,320	0.4
Langdale-Shawmut	1,190	0.2	1,190	0.1
Riverview	280	0.1	280	-
Fairfax	870	0.2	870	0.1
Phenix City	1,770	0.4	2,300	0.2
Eufaula	10,000	2.1	10,000	1.0
Subtotal Sew.	18,430	3.9	18,960	1.8
Industrial Waste				
Lanett Mill & Bleachery, Lanett, Ala.			79,000	7.6
Fairfax Mill, Lanett, Ala.			48,750	4.7
Lantuck Mill, Lanett, Ala.			290	-
Subtotal Ind. Waste			128,040	12.3
TOTAL - Alabama Sewage & Ind. Waste			147,000	14.1
TOTAL SEWAGE	476,645	100.0	814,290	78.3
TOTAL INDUSTRIAL WASTE			225,240	21.7
GRAND TOTAL	476,645	100.0	1,039,530	100.0

General Notes:

(1) Figures represent load in final effluent where treatment is provided.
(2) Domestic sewage from industries considered as part of the community sanitary sewage loads.
(3) BPE = Bacterial Population Equivalent - i.e. 1,000 BPE represents the number of total coliform bacteria present in raw sewage from a 1,000 population community.
(4) PE = Oxygen Demand Population Equivalent - i.e. 1.0 PE = 0.167 pounds 5-day B.O.D.
(5) - (dash) indicates less than 0.1% of the total load.

TABLE NO. 6

Total Coliform Bacteria - MPN/100 ml

Chattahoochee River & Tributaries

Oct.-Nov. 1964 Survey - Atlanta to Lake Harding

River Mile	No. of Samples	Mean Density at 50% Probability	Max. Density Exceeded 10% of Time	Min. Density Exceeded 90% of Time		
						CHATTAHOOCHEE RIVER
					← S	Marietta E. STP enters through Sope Cr. (416.1) " S.E. " " " Rottenwood Cr. (412.1)
408.2	42	2,800	13,000	360	W →	At Atlanta Mun. Water Supply Intake
					← S	Atlanta, Cobb & Douglas Co., & Fairburn STP's enter direct & through Nickajack, Sweetwater & Deep Creeks.
389.4	20	2,400,000	10,000,000	560,000		Ga. Hwy. 92
					← S	Palmetto STP enters through Big Bear Creek (383.5)
368.4	22	460,000	3,000,000	180,000		U. S. Hwy. 27A (Ga. 16) at Whitesburg
					← S	Newnan E. & N., Arnco & Sargent STP's enter through Wahoo Creek (364.2)
343.1	37	160,000	1,000,000	25,000		U. S. Hwy. 27 at Franklin
					← S W → ← S	Newnan W., & Grantville #1 STP's through New River (334.1) LaGrange Water Supply Intake (322.9) Grantville #2, Hogansville & LaGrange Treated & Untreated Sew. through Yellowjacket Creek (321.9)
316.2	15	55,000	200,000	11,000		Ga. Hwy. 238 West of LaGrange
306.7	15	37,000	160,000	5,000		0.3 Mile above West Point Water Supply Intake
					W → ← S	West Point Water Supply Intake (306.4) West Point Sewers (306.3 to 305.3)
305.2	45	50,000	130,000	11,000		Ga.-Ala. State Line
					W → ← S	Lanett Mun. Water Supply Intake (304.9) Lanett Sewers (304.5)
302.4	15	57,000	320,000	5,000		Airport Sampling Station
					← S	LaGrange Blue John STP enters through Long Cane Creek (302.3)
300.0	15	40,000	240,000	6,000		Pond above Langdale Dam
					← S	Langdale-Shawmut Sewers (299.9)
396.2	14	40,000	110,000	15,000		Pond above Riverview Dam
					← S	Riverview Sewers (296.1)
289.3	14	14,000	60,000	3,400		Upper Lake Harding
					← S	Fairfax Sewers enter through Osanippa Creek
						TRIBUTARIES
321.9-1.3	11	46,000	118,000	18,000		Yellowjacket Creek, Co. Rd. S-2089
306.5-0.2	3	320	760	140		Osligee Creek
302.3-1.7	15	38,000	155,000	3,000		Long Cane Creek
289.2-4.0	14	39,000	98,000	15,000		Osanippa Creek

GENERAL NOTES:

The Mean, Max., and Min. Densities were determined from logarithmic probability plots of measured densities.

Coliform Densities at the Atlanta Water Supply Intake at River Mile 408.2 were obtained from probability plots of the October 1963 through September 1964 Water Year Data provided by the Public Health Service Water Surveillance System.

Samples were not tested for Fecal Coliform during this survey.

TABLE NO. 7

Total Coliform Bacteria - MPN/100 ml

Chattahoochee River & Sewage Plant Effluents

June - July 1965 Survey - Walter F. George Reservoir Area

River Mile	Station Ident.	Buoy No.	No. of Samples	Mean Density at 50% Probability		Max. Density Exceeded 10% of Time		Min. Density Exceeded 90% of Time			
				Number	% Fecal Coliforms	Number	% Fecal Coliforms	Number	% Fecal Coliforms		
											CHATTAHOOCHEE RIVER
270.5	A	-	14	800	2	4,000	-	170	-	W ⟹	Columbus Water Supply Intake
										⟸ S	Columbus Sewers enter
269.4	B	-	13	3,600	1	20,000	8	1,800	-	W ⟹	Phenix City Water Supply Intake
										⟸ S	Columbus & Phenix City STP's (261.9 & 264.3)
258.1	C	309	13	490,000	37	2,200,000	32	380,000	9		Above Upatoi Creek
										⟸ S	Fort Benning STP #1 (257.7)
253.3	D	-	13	490,000	26	7,000,000	7	130,000	27		General Eddy Bridge
										⟸ S	Fort Benning STP #2 (252.7)
249.7	E	275	14	290,000	13	2,100,000	31	39,000	15		Above Oswichee Creek
										⟸ S	Fort Benning Harmony Church STP (248.7)
241.8	F	255	14	80,000	19	390,000	14	16,000	25		River Bend Park
231.9	G	214	13	8,000	22	45,000	13	1,400	25		Above Bluff Creek
223.2	H	190	11	1,800	28	12,000	10	560	21		Florence Landing
214.8	37	-	9	600	4	3,200	9	60	1		
208.2	I	92	3	250	8	330	-	< 20	-		
203.5	36	-	17	740	8	20,000	6	30	10		U. S. Hwy. 82 Bridge at Eufaula
										⟸ S	Eufaula Sewers (203.2)
192.4	34	-	8	8	-	80	-	1	-		
											Walter F. George Lock & Dam (182.5)
											SEWAGE TREATMENT PLANT EFFLUENTS
264.3	PC	387	3	2,200,000	31	3,500,000	31	1,100,000	45	⟸ S	Phenix City STP Effluent
261.9	CO	368	4	220,000,000	30	540,000,000	30	57,000,000	21	⟸ S	Columbus STP Effluent
257.7	FB #1	305	8	300	9	5,000	20	20	-	⟸ S	Fort Benning STP #1 Effluent
252.7	FB #2	279	7	1,500	9	8,000	19	< 20	-	⟸ S	Fort Benning STP #2 Effluent
248.7	FB #3	-	1	4,900	4	-	-	-	-	⟸ S	Fort Benning Harmony Church STP Effluent

TABLE NO. 8

Fecal Coliform Bacteria - MPN/100 ml

Chattahoochee River & Sewage Plant Effluents

June - July 1965 Survey - Walter F. George Reservoir Area

River Mile	Station Ident.	Buoy No.	No. of Samples	Mean Density at 50% Probability		Max. Density Exceeded 10% of Time		Min. Density Exceeded 90% of Time			
				Number	% of Tot.Coli.	Number	% of Tot.Coli.	Number	% of Tot.Coli.		
											CHATTAHOOCHEE RIVER
270.5	A	-	13	20	2	-	-	< 20	-	W ⇒	Columbus Water Supply Intake
										⇐ S	Columbus Sewers enter
269.4	B	-	13	50	1	1,600	8	< 20	-	W ⇒	Phenix City Water Supply Intake
										⇐ S	Columbus & Phenix City STP's (261.9 & 264.3)
258.1	C	309	13	180,000	37	700,000	32	33,000	9		Above Upatoi Creek
										⇐ S	Ft. Benning STP #1 (257.7)
253.3	D	-	12	130,000	26	470,000	7	35,000	27		General Eddy Bridge
										⇐ S	Ft. Benning STP #2 (252.7)
249.7	E	275	13	37,000	13	650,000	31	6,000	15		Above Oswichee Creek
										⇐ S	Ft. Benning Harmony Church STP (248.7)
241.8	F	255	13	15,000	19	55,000	14	4,200	25		River Bend Park
231.9	G	214	12	1,800	22	6,000	13	350	25		Above Bluff Creek
223.2	H	190	11	500	28	1,200	10	120	21		Florence Landing
214.8	37	-	9	25	4	300	9	2	1		
208.2	I	92	3	20	8	-	-	< 20	-		
203.5	36	-	17	56	8	1,200	6	3	10		U. S. Hwy. 82 Bridge at Eufaula
										⇐ S	Eufaula Sewers (203.2)
192.4	34	-	8	< 2	-	< 20	-	< 2	-		
											SEWAGE TREATMENT PLANT EFFLUENTS
264.3	PC	387	3	680,000	31	1,100,000	31	490,000	45	⇐ S	Phenix City STP Effluent
261.9	CO	368	7	65,000,000	30	160,000,000	30	12,000,000	21	⇐ S	Columbus STP Effluent
257.7	FB #1	305	8	27	9	1,000	20	< 20	-	⇐ S	Ft. Benning STP #1 Effluent
252.7	FB #2	279	7	140	9	1,500	19	< 20	-	⇐ S	Ft. Benning STP #2 Effluent
248.7	FB #3	-	1	170	4	-	-	-	-	⇐ S	Ft. Benning Harmony Church STP Effluent

TABLE NO. 9

SALMONELLA REPORTS[*]

(Isolations from the United States)

Rank (June)	Serotype[**]	No.	Per Cent	Rank (May)
1	*S. typhi-murium* & *S. typhi-murium var. copenhagen*	786	36.2	1
2	*S. heidelberg*	156	7.2	2
3	*S. infantis*	116	5.3	3
4	*S. newport*	106	4.9	5
5	*S. meleagridis*	105	4.8	Not Listed
6	*S. saint-paul*	76	3.5	8
7	*S. enteritidis*	74	3.4	4
TOTAL -		1,419	65.3	

Total Salmonella isolated (June) - 2,174

[*] SOURCE: Excerpt from Salmonella Surveillance Committee Report No. 39, July 30, 1965, Communicable Disease Center, Atlanta, Ga.

[**] 7 most commonly reported from human sources.

TABLE NO. 10

Salmonella Bacteria

Chattahoochee River & Sewage Plant Effluents

June - July 1965 Survey - Walter F. George Reservoir Area

River Mile	Station Ident.	Buoy No.	Coliform Bacteria Mean Density MPN/100 ml		Salmonella		
			Total	Fecal			
							CHATTAHOOCHEE RIVER
207.5	A	-	800	20	S. montevideo S. muenchen	W ⟹	Columbus Water Supply Intake
						⟸ S	Columbus Sewers enter
269.4	B	-	3,600	50	S. heidelberg	W ⟹	Phenix City Water Supply Intake
						⟸ S	Columbus & Phenix City STP's (261.9 & 264.3)
258.1	C	309	700,000	180,000	S. new brunswick S. derby S. heidelberg		Above Upatoi Creek
						⟸ S	Fort Benning STP #1 (257.7)
						⟸ S	Fort Benning STP #2 (252.7)
						⟸ S	Fort Benning Harmony Church STP (248.7)
241.8	F	255	80,000	15,000	S. typhimurium S. heidelberg S. saint-paul S. infantis		River Bend Park
231.9	G	214	8,000	1,800	Swab removed by others		Above Bluff Creek
223.2	H	190	1,800	500	S. typhimurium S. montivedo S. infantis		Florence Landing
208.2	I	92	330	20	Swab removed by others		54 Mi. Below Columbus STP - 5 Mi. Above Eufaula
						⟸ S	Eufaula Sewers (203.2)
							Walter F. George Lock & Dam (182.5)
							SEWAGE TREATMENT PLANTS
264.3	PC	387	2,200,000	680,000	S. newport	⟸ S	Phenix City STP Effluent
261.9	CO	368	220,000,000	65,000,000	S. typhimurium var. copenhagen S. heidelberg S. derby	⟸ S	Columbus STP Effluent
257.7	FB #1		300	27	None Recovered	⟸ S	Fort Benning STP #1 Effluent
252.7	FB #2		1,500	140	None Recovered	⟸ S	Fort Benning STP #2 Effluent

TABLE NO. 11

5-day B.O.D., D.O., & Temperature

Chattahoochee River

River Mile	Location	Field No.	5-Day B.O.D.(mg/l) No. of Samples	5-Day B.O.D.(mg/l) Avg.	5-Day B.O.D.(mg/l) Max.	5-Day B.O.D.(mg/l) Min.	D.O. (mg/l) No. of Samples	D.O. (mg/l) Avg.	D.O. (mg/l) Max.	D.O. (mg/l) Min.	Temp.(°C.) Avg.	Temp.(°C.) Max.	Temp.(°C.) Min.
	CHATTAHOOCHEE RIVER												
343.1	Franklin (U.S. Hwy. 27)	C-1	7	2.7	4.2	1.8	14	7.0	9.8	8.2	16	20	12
316.2	West of LaGrange (U.S. Hwy. 238)	C-2	7	2.2	3.2	1.4	20	8.8	9.8	7.9	16	18	13
306.7	Above West Point (Above W.W. Intake)	C-3	7	2.9	5.8	1.4	20	9.1	9.8	8.6	16	19	14
305.2	State Line (Below West Point Sewers)	C-4	25	2.1	3.6	1.4	45	9.1	9.7	8.5	16	17	14
302.4	Airport Station (Below Lanett Sewer)	C-5	12	4.0	5.4	1.2	16	8.8	9.5	8.3	16	18	14
300.0	Langdale Dam Pond	C-6	12	2.8	4.4	1.4	20	8.7	9.7	7.9	16	19	13
296.2	Riverview Dam Pond	C-7	10	3.5	6.6	1.8	20	9.4	9.9	8.7	16	18	14
289.3	Lake Harding (Upper End)	C-8	12	2.6	4.4	1.6	15	9.4	10.0	8.5	16	18	15
	TRIBUTARIES												
321.9-1.3	Yellowjacket Creek	YJ-1	6	4.3	13.2	2.0	13	9.5	10.0	8.9	16	17	12
306.5-0.2	Osligee Creek	O-1	3	2.4	4.2	1.2	4	9.7	10.0	9.2	15	16	14
302.3-1.7	Long Cane Creek	L-1	6	3.7	5.0	1.5	15	6.5	7.9	5.3	14	18	11
289.2-4.0	Osanippa Creek	S-1	6	7.9	14.4	2.4	15	7.3	9.7	5.6	15	17	12

TABLE NO. 12

Dissolved Oxygen & Temperature

Chattahoochee River
Walter F. George Reservoir

June - July 1965 Survey

DISSOLVED OXYGEN - mg/1

RIVER MILE

Depth (feet)	253.3	249.7	241.8	231.9	227.1	223.2	203.5	195.0	188.2	Depth (feet)
3	6.2	6.5	7.1	7.2	7.8	8.0	8.0	7.7	8.9	3
10	6.0	6.3	7.0	6.7	6.4	5.7	5.0	6.0	8.9	10
15			6.5							15
20	6.0	6.3		6.3	5.4	5.0	2.6	1.7	2.5	20
30				6.0	5.2	4.9	2.2	1.2	0.5	30
40				5.8	5.1	4.7	1.5	1.0	0.4	40
45					5.0		1.2	0.7	0.3	45

TEMPERATURE

DEGREE C.

Depth (feet)	253.3	249.7	241.8	231.9	227.1	223.2	203.5	195.0	188.2	Depth (feet)
3	27.0	27.1	28.0	28.0	29.0	29.0	29.5	29.9	29.7	3
10	27.0	27.0	28.0	28.0	28.0	27.0	28.0	29.2	29.7	10
15			28.0							
20	27.0	27.0		27.5	27.1	27.0	26.1	27.0	27.0	20
30				27.3	27.0	27.0	26.0	25.8	25.3	30
40				27.0	27.0	27.0	25.2	25.1	25.0	40
45					27.0		25.2	25.0	24.9	45
50							25.5	25.4	25.0	50
60							25.0	25.4	25.0	60
69							24.9			69
70								25.0	24.7	70
75								24.5		75
80									24.5	80
90									24.0	90
100									23.7	100

TABLE NO. 13

Time of Passage

Chattahoochee River System

June - July 1965 Survey

LOCATION		ELAPSED TIME - DAYS	
	River Mile	High Flow Release	Low Flow Release
Phenix City STP	264.3	0.00	0.00
Columbus STP	261.9	0.04	0.19
"C" above Upatoi Creek	258.1	0.15	0.43
"D" General Eddy Bridge	253.3	0.34	0.58
"E" Buoy 275	249.7	0.44	0.65
"F" River Bend Park	241.8	1.23	1.46

TABLE NO. 14

Stream Discharge
Chattahoochee River System
Alabama-Georgia

MEAN DAILY DISCHARGE - 1963-1964 WATER YEAR	Max.	Min.	Mean
Chattahoochee River at Atlanta	18,000	782	3,769
Chattahoochee River at West Point	53,500	1,470	7,625
Chattahoochee River at Columbus	110,000	800	10,420

DISCHARGES DURING OCT.-NOV. 1964 SURVEY	Max. Record	Min. Record	Mean During Survey
Chattahoochee River at Franklin	7,150	2,120	3,945
Chattahoochee River at West Point	7,900	3,080	4,960
Yellow Jacket Creek	293	147	213
Long Cane Creek	93	48	60
Osanippa Creek	182	107	132

RELEASES FROM OLIVER DAM AT COLUMBUS
(During Monday, June 28, 1965 to Saturday, July 3, 1965 Survey)

	CFS
Max. Instantaneous Release	12,160
Min. " "	1,240
Max. Mean Daily Discharge	7,046
Min. " " "	2,845
Avg. " " "	4,965

MR. WEST: That is the end of the report, Mr. Chairman.

CHAIRMAN STEIN: Thank you, Mr. West.

Are there any comments or questions?

MR. HOWARD: One question and a comment. You made some special studies, Al, of the Salmonella.

MR. WEST: Yes sir.

MR. HOWARD: And you made the point by implication at least that it is a health hazard. You defined Salmonella as a health hazard, and we agree with that. What I wanted to ask was this: Did you attempt to coordinate these special studies with the States of Alabama and Georgia?

MR. WEST: Sir, what was the question?

MR. HOWARD: The question was this: When the Service carried on the special studies on Salmonella, did you advise the States of Alabama and Georgia in an attempt to coordinate with the States of Alabama and Georgia in those studies?

MR. WEST: The States of Georgia and Alabama were advised of our work and cooperated in some of it. I don't recall that we specifically told them how we were going to run Salmonella.

MR. HOWARD: The State of Georgia, of course, cooperated with the Service on the various studies. But as far as I know and have a record of, as far as the Water

Supply Service of the Georgia Department of Public Health was concerned, we were not informed of any special studies.

Another question is --

CHAIRMAN STEIN: May we have a clarification for the record? For those people in the audience who are from the Public Health Service and may think this is critical of PHS, the point is we are no longer in the Public Health Service. If this were done, it was at the instigation of the Federal Water Pollution Control Administration.

MR. HOWARD: I just want to get you fellows in the new Department of the Interior back to the policy of Congress -- to cooperate with the States. And I want to mention that.

CHAIRMAN STEIN: I think I see your point. That is our policy, you know, sir.

MR. HOWARD: I am glad he made the studies, because they are interesting. But I am wondering, after finding Salmonella there and making such a case of the public health hazard, why we weren't notified immediately and why the plant operators in Columbus, Phenix City and the State of Alabama weren't notified that this thing existed.

MR. ROGERS: I'm not sure what notification was given. I don't know whether any of my staff can answer this or not.

Mr. Trombetta, can you answer?

MR. S. J. TROMBETTA (Chief, Water Quality Activities, Federal Water Pollution Control Administration, Southeast Region): Can you repeat it, please, Rock?

CHAIRMAN STEIN: Will you come up here, Mr. Trombetta?

MR. HOWARD: Mr. Trombetta, I was justtrying to find out if there was any consideration and cooperation between the States of Alabama and Georgia and the Service at that time on those Salmonella studies, or did you all sneak out there and do them?

MR. TROMBETTA: I don't believe I have your question straight or your statement, Mr. Howard. We tried to keep both States informed of all of our activities. As to the specifics of the Salmonella test, I frankly don't recall this.

MR. HOWARD: The State of Georgia was not informed of it. I don't know about Alabama.

MR. ROGERS: Let me ask this: Did we provide the raw data after it was collected to the State?

MR. HOWARD: No.

MR. TROMBETTA: No, I don't believe that was forthcoming, was it, Al? In other words, we passed to them whatever came to us, but I don't believe this came down in the early stages.

MR. HOWARD: Al, just so we don't confuse the public, we would expect to find Salmonella where we have a metropolitan area discharge of treated or untreated sewage into a river such as the Chattahoochee or Potomac, wouldn't we?

MR. WEST: We would expect to find Salmonella in rivers below sewage discharges that aren't adequately disinfected.

MR. HOWARD: Thank you.

MR. ROGERS: On this same question, could you indicate why we didn't find this below Atlanta?

MR. HOWARD: You didn't look for it hard enough probably.

MR. ROGERS: Mr. West.

MR. WEST: Why didn't we find Salmonella below Atlanta? Because that survey was conducted a year before, and the Salmonella tests were not run.

As a matter of fact, this Salmonella test, which is proving very, very useful, was being developed, or, rather, the final development of this test was occurring at that time. It is only since last year that we are now able to include it routinely in all of our survey procedures where we are evaluating the health hazard associated with sewage discharges.

So the reason we didn't find them below Atlanta is because we were not looking for Salmonella at that time.

MR. HOWARD: I think, Al, if you had looked, you wouldn't have found them, because all that industrial waste probably kept them from surviving.

CHAIRMAN STEIN: You know, Mr. Howard, your point is well taken. As you know, I think, our policy is, particularly on these new tests where we are looking for Salmonella, to work very closely with the State officials and particularly the health officials on the Salmonella cases in the various States.

I know where we perfected this test or at least ran the field demonstrations in the Dakotas and in Minnesota, we worked very closely with the health departments up there.

I think if it were not done here, it will be done in the future.

But on one particular point, particularly in dealing with sugar beet wastes and pulp and paper wastes, we have found that, instead of suppressing the Salmonella, the wastes added by this industrial effluent -- or possibly it is the medium of the sugars that the industrial effluent puts out -- add more Salmonella.

This has been the interesting part of our findings. For years we have always had the question -- and I know many people from these industries are here -- of whether we have to disinfect sugar beet wastes or pulp and paper wastes.

The conclusion of our scientists in the cases that we have looked into so far is that these wastes have to be disinfected, because they are finding Salmonella present in the effluent. And this is I think, at least for the people who have been following water pollution and for the plant managers, a very interesting implication.

MR. HOWARD: What was that crack about putting diapers on ducks? On some of these reservoirs we have a lot of ducks, and they also discharge Salmonella.

CHAIRMAN STEIN: Yes.

Mr. Rogers.

MR. ROGERS: I had just a comment here, Mr. West. You speak of handling of the storm waste and mention only separation. I think you want to clarify the point that it can be treated other ways too, other than separation.

MR. WEST: Yes. We can clarify this by discussing it for an hour. But right now there are studies going on as to how to most practically and economically eliminate the health hazard from the discharge of storm wastes which contain sewage. The two things I have mentioned are things that obviously should be done.

In addition to this, it would be possible to collect and treat the stormwaters, to put them in large basins and chlorinate them, or to chlorinate them directly in the sewers if the sewers have sufficient holding space.

Then we have some "way out" ideas from some other folks about inserting additional pipes, plastic pipes, within storm sewers. There are maybe half a dozen or more suggested means of improving this.

I think I should include chlorination of storm overflows along with the specific recommendations that I had made. This would be a practical approach to the problem.

MR. HOWARD: Mr. Chairman, this is a different problem.

CHAIRMAN STEIN: I would agree with you, Mr. Howard, as a matter of general approach, and this is what we have done throughout the country. I think the first order of business will be to get the sewage and industrial wastes treated. We recognize there is a stormwater problem, but we have to take a different approach on that. The time schedule may be a little different.

DR. MYERS: Mr. Chairman, before you leave this subject of Salmonella completely, recognizing that

Salmonella is a pathogen and it may have a human origin and animal origin, and since there is a significant number of animals other than man in this particular area, do you have now a recommendation regarding a standard method for the determination of Salmonella? Or if you do not have one, do you anticipate one?

CHAIRMAN STEIN: Can you answer that, Mr. West?

MR. WEST: Yes, I can. This test is quite old but has been refined to useful proportions very recently by a Mr. Spino* in Cincinnati. I know he has written a paper on the Salmonella determination test. I don't know if it has been published as yet. But the information is available and Mr. Spino is available to discuss this and assist our various regional groups and State groups that are interested in this Salmonella test.

CHAIRMAN STEIN: No, here was the question. Let me rephrase it. The question that Dr. Myers asked is whether we are going to get it into standard methods.

As you recall, Harold Clark developed a fecal Streptococci test. After he developed it and put out the papers, he introduced that to the group considering standard methods for a year or two. It was put in the appendix as a tentative standard method so it could be used rather widely. I think it finally (in the last edition, if I am not mistaken,) either will become or is becoming an accepted standard method.

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*Mr. Donald F. Spino (Cinn. Lab, FWPCA)

The question is: With our refined techniques of Salmonella detection, are we going to go through the process of trying to get that, if you are using it routinely, universally accepted as a standard method?

MR. WEST: I can only assume that we will take the steps to introduce it as a standard method, hoping that it will be approved by the Standard Methods Committee. Yes, it will be introduced to the Committee for their consideration.

CHAIRMAN STEIN: Thank you. Are there any other comments or problems?

Pardon me, Doctor.

DR. MYERS: I have two other questions.

Mr. West, you have stated in your report that a deficiency in dissolved oxygen existed below the Walter F. George Lock and Dam. Since you have made recommendations for treatment of domestic sewage and industrial wastes, do you have recommendations for correction of the deficiency in dissolved oxygen below this dam?

I am raising this question as it appears that low-level withdrawal from Walter F. George Reservoir for hydro-electric purposes is responsible for this condition.

I think this is something very worthy of note, and I wonder if you have a recommendation for solving this problem.

MR. WEST: I believe the reason that wasn't covered in this report is because it is very difficult to answer. But I will attempt to right now.

Okay. This is a new reservoir, and it may be that during the additional stabilization of the reservoir more dissolved oxygen will have been reduced by the decay of the vegetative growth there than will be the case in the future.

There is a problem there now. There is no question about it. If this problem persists, a recommendation should be included to abate the condition of low dissolved oxygen below Fort Gaines.

Now, if this reservoir stabilizes and there is dissolved oxygen finally in the lower reservoir, the problem will have solved itself.

All right. Now, we have also considered what can be done in cases like this. If it is not resolved, then one of a number of methods for introducing dissolved oxygen below reservoirs should be considered. I don't know which is the more practical for this particular case.

I do know that in some cases they provide high-level weirs near the dam so that the oxygenated surface waters are pulled off. In others they have re-regulating reservoirs where they can discharge surface waters.

In Wisconsin they sometimes have turbine aeration, where air is pumped in to the turbines.

All of these are considered, and I think one or more of these -- I must say this -- will most probably go in all new significant dam construction projects. It is a very expensive procedure, and I don't know which is the most appropriate for attempting to remodel, as you might say, an existing reservoir.

That is the best I can do on that one.

DR. MYERS: I think this is a very important issue, because it seems to be a type of operational pollution. I believe you have alluded to the fact that maybe this is temporary. A portion of it may be, but I doubt that the significant difference here is going to be solved on a temporary basis.

We have observed this in other locations, and I think that the solution to the problem is worthy of Federal notice and certainly should be taken into consideration in the installation of dams and the operation thereof.

It is an operational type of pollution which is a little different. We have thermal pollution and other types, and this I believe is operational, because most of your charts will show if you get deep enough in your water in your draw-off, you are going to have a very low oxygen demand, and this ending up below the dam can be very detrimental to the uses of water below that dam.

CHAIRMAN STEIN: May I suggest this as a procedure for clarifying this:

One, I wonder if we can in due course -- and it will be next -- hear from the Corps. Let's hear what they have to say.

I think we are also very fortunate, in my opinion, to have one of the Nation's experts on this problem, Mr. F. W. Kittrell, who is the head of our investigation group.

Now, all the experts in this area -- I don't want to pick out Mr. Kittrell -- all seem to come from the TVA. But when we constructed the TVA reservoirs, we did not anticipate the problem. The people who were working on water quality through the years in TVA had an opportunity to examine this and work with this. I know Mr. Kittrell and his compatriots down there like Milo Churchill worked on this problem for some 30 years.

I think, Doctor, you have indicated a real problem. But perhaps the best way to do it is to let the Corps make its presentation first. Then we will raise the question, and if necessary call on Mr. Kittrell for further clarification and statement.

DR. MYERS: I have one other question I would like to raise.

Mr. West, your report shows that Eufaula, Alabama discharges untreated sewage, contributing almost half of the bacterial load -- that is, from Alabama -- and more than half of the oxygen demand attributed to our State.

During August 1965 Eufaula completed construction of a sewage stabilization lagoon providing secondary treatment of its sewage.

Have you adjusted your figures to reflect this improvement? It is a considerable improvement from our standpoint, and it would change a number of the figures presented in this particular report.

MR. WEST: No, sir, I have not adjusted this report figure for any improvements that have taken place since the time this data was gathered and the surveys were conducted. I assume that Mr. Howard may ask the same question.

I know that improvements have been made along the river, but that was in such a great state of flux that we couldn't write a report. We would change it every month while we were writing it.

But I think it should go on the record, and I am glad you put on the record that Eufaula has provided this secondary treatment facility that would reduce -- I just have to talk about most practical reductions in that type of a treatment plant -- the BOD load by at least 85 per cent, possibly 90, and would reduce the coliform load I should say at least by 95 per cent and more closely 99 per cent.

So I would assume that on the record you should state you have this treatment, and if I were to append these tables right now, without taking samples, I would say Eufaula discharged about 100 bacterial population equivalents, and possibly around 1,000 or so BOD population equivalents instead of the 10,000 that were shown in the report.

CHAIRMAN STEIN: Thank you.

Mr. Howard, do you have anything?

MR. HOWARD: I was going to raise the same question, but I will speak about that later.

CHAIRMAN STEIN: Right. Okay. Thank you.

You know, writing a report on pollution control is like visiting the zoo, You never see it the same twice. You see, some animals are born, and some die. And the river is never the same. And improvements go on.

There must come a time when you write this. We do have this problem in practically every report we put out, particularly in a case of this kind where both these States have active programs and are making considerable progress.

Are there any comments on this end, Mr. Rademacher, or Mr. Rogers?

MR. RADEMACHER: I have one comment, Mr. Chairman.

Just for clarification, Mr. West, can you give us any estimate, or are any estimates available, of just how many people use these waters for recreation, for swimming, boating, fishing, in the areas down below Atlanta all the way down to the George Reservoir? What is the potential?

MR. WEST: No, I have no numbers or counts. But we saw people water-skiing. We saw people boating and fishing. It is an attractive body of water.

There are marinas. I recall seeing some of them around the Walter F. George Reservoir very crowded, operating at capacity, with people going fishing.

We do know that we see all over the country an explosive growth of the use of any decent water supply that is suitable for water recreation.

So it is a very valuable and real use of these water resources.

CHAIRMAN STEIN: Are there any other comments?

Mr. Rogers.

MR. ROGERS: Possibly I can add to this. In the study done by the Southeast River basins, the data for

1960 shows about eight million user days of recreation in the Chattahoochee-Flint River basins.

About five million I think were at Lake Lanier at that time. This leaves about three million for the rest of the basins. Some would be in Jim Woodruff Reservoir, some on smaller power lakes.

Actually through the year 2,000 it is estimated at 58 million user days for the Chattahoochee-Flint River system.

CHAIRMAN STEIN: Thank you.

MR. ROGERS: This is a tremendous increase from what we have now.

CHAIRMAN STEIN: Thank you. Are there any other comments?

(No response.)

If not, I have a couple of questions, one for clarification.

You talk in terms of the recommendation of secondary treatment and chlorination of the effluent -- a disinfection of the effluent -- from municipal wastes. By that do you mean a year-round disinfection?

MR. WEST: I would mean year-around disinfection wherever we are above a source of water supply.

Where we are above a source of water that is used for recreational purposes only in the summertime, then disinfection could be applied maybe beginning a few weeks to a month before the start of the recreational season and continuing through a month after the recreational season.

CHAIRMAN STEIN: Don't you have navigation and water-contact activity here pretty much around the year?

MR. ROGERS: Columbus and below.

CHAIRMAN STEIN: Yes.

MR. WEST: I haven't gone into that.

CHAIRMAN STEIN: Well, maybe the Conferees --

MR. WEST: But, as a general statement, there should be adequate disinfection at all times of the year that there is any use of the water.

CHAIRMAN STEIN: Well, you know, even up as far north as the lower end of Lake Michigan, where there was substantial water-contact activity and navigation, at least the States there agreed that they had to require year-round disinfection. This may be a problem we will be taking up with the Conferees.

I have one other question.

You talked in your summary in terms of untreated wastes from nine separate industries. I guess you considered all that unsatisfactory.

MR. WEST: Yes sir.

CHAIRMAN STEIN: How about the heat from the three steam-generating plants?

MR. WEST: The heat from the three generating plants also is unsatisfactory in the river. It increases the rate of decomposition, and it magnifies any pollutional effect.

We didn't cover that in great detail, because these effects were felt in the intrastate reach of the river, and we were charged with the study of the effects on the inter-state river.

CHAIRMAN STEIN: Right.

Now, the next point. You had treated and untreated sewage from 26 cities. That might be a little ambiguous. If it is treated, it might be all right. How many of those 26 cities do you think adequately collect, treat and disinfect their sewage or their waste material now? Or do all of them need remedial facilities?

MR. WEST: Basically, there are a few that have secondary treatment with effluent disinfection that are adequate. But the bulk of the wastes -- and that includes the large cities -- requires increased treatment and disinfection.

CHAIRMAN STEIN: I think possibly before we are through, if we name the 26 cities and agree that some of them, if there are some, are doing a reasonable job now, maybe it might be possible to indicate this.

MR. WEST: Yes. This is indicated in detail in the tables.

CHAIRMAN STEIN: I think that very well may be covered in the State statements.

I don't have any further comment or question.

Thank you very much, Mr. West, for a very excellent report.

MR. WEST: Thank you.

CHAIRMAN STEIN: It was comprehensive.

MR. WEST: Thank you.

CHAIRMAN STEIN: Mr. Rogers.

MR. ROGERS: I wonder if any representatives came in from Congressman Weltner's or Congressman MacKay's offices?

(No response.)

If not, we might proceed actually with the Federal Government's presentation. We are happy that General George H. Walker could be with us this morning. He had indicated at first that he could not be present. But General Walker, District Engineer of the South Atlantic Division, Corps of Engineers, is with us this morning, and he will introduce some of his staff and also some of his District people who will be making statements.

General, it is nice to have you here.

STATEMENT OF

MAJOR GENERAL GEORGE H. WALKER, U.S.A., DISTRICT ENGINEER, SOUTH ATLANTIC DIVISION, CORPS OF ENGINEERS.

GENERAL WALKER: Thank you, Mr. Rogers and Mr. Stein.

Actually, I didn't plan a formal statement at this point. I had welcomed the opportunity to listen and to participate if called upon at this meeting, because certainly the Corps of Engineers thinks that this is a most important undertaking.

I want to assure all of the assembled group of our fullest support of it.

I do have representatives here from our Mobile District. Mr. Eckstine is prepared to talk in detail on the operation of the reservoirs on the Chattahoochee if this becomes appropriate. Mr. Traina, who is the Chief of Engineers of our Savannah District, is present. Mr. Leach from my own office is present.

I think perhaps we may hold off presentations by them unless there are certain particular points where their comments may be appropriate, sir.

I would like to say we are not only interested but somewhat involved in this problem. I can think of three aspects of involvement.

One, a slight addendum to the splendid report which was given this morning. I was happy to see that the effluent from Fort Benning was pretty good. I would like to state that we are now in the process of building the secondary plants to replace those primaries. Those will be completed I believe in December. Is that right, Mr. Traina?

MR. CHARLES F. TRAINA: Yes.

GENERAL WALKER: So we should have a very complete treatment for Fort Benning by that time.

With more direct Corps of Engineers participation, I think we are involved at both ends of your area of study with our Buford Reservoir at the top and Walter F. George at the bottom.

It seems to me that we have an inherent capability of being of some assistance in this program. Certainly, by the regulatory work of our reservoirs, we are able to augment the low flows of the streams which become virtually dry during prolonged periods of drought, and this is a help. But it is the Federal policy and I believe it is a matter of law in this regard -- but I stand open for correction here --

CHAIRMAN STEIN: Right.

GENERAL WALKER: -- that our activities here are not a substitution for adequate treatment of sewage.

They are an assistance. We would be most happy to be open-minded to anything we can do that would be of assistance in this regard.

Now, it may be -- in fact, would be -- very helpful to us if the experts in the field, both in the Federal water pollution control field and in the States, could help us in the evaluation of augmented flows.

We operate the Buford Dam, as I am sure most of you know, under an authorization from Congress which places an emphasis on the production of power. If we diminish the return to the taxpayer and to the Federal Government by a reduction of power, then we ought to have some businesslike manner of balancing that.

So any help that you can give us in this regard in evaluation, in terms of dollars if you can, of increased flows, would be extremely helpful to us.

Secondly, we are quite concerned about the matter of pollution of the waters as they enter our reservoirs. It could well be that a reservoir which is very necessary and very needed for other purposes -- of flood control, of power perhaps, or of recreational benefit to the community -- might be undesirable if the inflowing waters are too contaminated. And, in fact, I wouldn't be surprised if we don't find that to be the case in a reservoir which we are now currently studying which we would like to recommend just below Atlanta in the Newnan area.

So, there again, this is of supreme interest to us to see these fine waters cleared up.

A couple of points have been raised this morning that perhaps I should comment on. The action of the reservoirs with regard to pollution -- the matter of the low oxygen content -- is a matter of real concern to us. We are now constructing the West Point Reservoir. In the course of our designing for this, which is going on concurrent with a portion of the construction, we are actively studying the possibility and the economics of variable outlet works. Here again I think we need some help from other experts in the field to allow us to make a sound economic balance of that.

I know the experts understand, whether the audience in general does or not, that while there is a low oxygen content immediately below the dam or in the deepest reaches of the reservoir, this rather quickly clears up as it enters the stream and has the turbulence of the stream on down.

So I think what we must do in the interest of the taxpayers' money that we are fooling with here is to know what the value of this increased oxygen content is immediately downstream compared to the cost of inserting it.

So, as I say, we are studying this. We certainly want to do everything we can to be an active partner in this field. But I think we have got to do it on a business-like basis.

I was most pleased to see that the reservoirs in terms of bacteriological conditions offer a rather dramatic improvement. This was brought out by this report. Just downstream from the Georgia Power Company's Harding Dam there was a dramatic reduction in the bacteriological content of the water, and similarly below the Walter F. George Dam, our facility there.

Like all Federal agencies, we are bound by the governing laws and the specific legislation with regard to our projects and by regulations which are established by the Administration. But I want to make this point quite clear: This doesn't mean by any sense of the word that we are inflexible in our approach.

This is a most important public undertaking that we are considering today. We are eagerly looking for new ideas by which we can help in this field. If there is a matter of revision of legislation, if there is a matter of revision of regulation which is within our authority to do, we are eagerly looking for these, because I do think this is, as I say, a most important undertaking.

Thank you.

CHAIRMAN STEIN: Thank you, General.

Are there any comments or questions?

MR. ROGERS: I wonder, since we have had the question raised about the Walter F. George, if we could just have one of your staff generally talk about the operation.

GENERAL WALKER: Yes. With particular regard to the oxygen content?

CHAIRMAN STEIN: I think we recognize there are two problems here, General. One is the augmented low flow. I don't know if the people in the audience know this, but particularly in a stream that dries up, or in a regulated stream, you may not have flows at particular times. As a matter of fact, I think, unless by design we have a wild river or something, you are going to find very, very few natural streams left in the country as time goes on. Most streams are regulated.

Now, you can have all the best pollution control in the world, but if at times you dry up a stretch of the stream, you are going to kill off all the aquatic life and the supporting life as effectively, or more effectively in some cases, than you could by pollution.

Once you wipe that life out, it takes quite a time for it to come back.

Also we have the problem, for example, with these dams that use hydro for peak power that shut down on weekends. Then, when they start up again and the water comes in, they get the accumulated effluent, flush it down all at once, and we have a problem.

So we have these questions of augmented flows from the impoundments. In many areas of the country, the Corps has been most cooperative. I know the General was up in the Missouri Basin, and he has done considerable work there.

During navigation season on the Missouri, we need 30,000 cubic feet a second. We had an inadequate waste treatment problem and are in the process of correcting it now. It was in the big cities on the Missouri -- St. Louis, Kansas City, St. Joseph, Omaha, Sioux City.

During the non-navigation season of the winter months, the Corps gave us 10,000 cubic feet a second of water just to go down the Missouri to carry those wastes away.

The General is absolutely right. We cannot supply augmented low flow as a substitute for waste treatment at the source. We must have that.

There is another point that I think you understand. Both the Corps of Engineers and we go before the same Committees of Congress, so it behooves us to work very closely together, in any event.

But there is, aside from this low flow augmentation, this other problem. That is the problem of discharging water from a reservoir, from a stratum of that reservoir, that does not have sufficient oxygen in it at the time to maintain fish and aquatic life. Very often this goes out for cooling purposes or just a discharge. When it gets to the stream, the water does not have any oxygen, and as you might expect, disastrous effects on fish and aquatic life occur.

As the General points out, in time it does recover as it goes through the stream and picks this up. Like any pollution problem, in time that does recover -- unless it is inorganic in some cases -- if you wait long enough.

So this is the particular problem I think that Dr. Myers raised, and I wonder if anyone could possibly talk about that.

GENERAL WALKER: I think so, sir, and I thank you for your fine amplification of my remarks on low flow.

I would just like to add one other thought. We believe -- and I think it is established -- that actually our reservoirs improve on nature, on the wild river. There are an awful lot of drought periods that nature brings to us in which there is virtually no flow. By conserving these waters and releasing them during that period, we can greatly help.

Now, with regard to the operation of the Walter F. George, I know that this matter has been quite thoroughly studied by our office long before I arrived here. I know that we are maintaining a close watch on the conditions there. There are some temporary measures that we can and will take when conditions warrant them, such as increasing the flows, even cracking the navigation lock gates there to allow some of the upper waters to escape and having better blend of waters. There may be other matters I am not aware of.

Larry, could you or maybe Mr. Eckstine comment on this a little bit?

This is Mr. Leach of our South Atlantic Division Office.

STATEMENT OF

LAWRENCE G. LEACH, SOUTH ATLANTIC

DIVISION OFFICE, CORPS OF ENGINEERS

MR. LEACH: This matter of reservoir mechanics is rather a complicated engineering subject, and I am by no means expert on it. I would prefer to defer to Mr. Kittrell probably.

But we are studying it. We are learning a lot about it. The thinking is changing as we are going along.

First of all, the problem is not continuous.

It only happens under certain circumstances, generally in the real hot summer months, the late summer and early fall, when the reservoir becomes stratified. That is, the upper surface is warm, and the lower levels are cold. That cold water on the bottom will be low in oxygen.

If we draw off from the lower levels, as we do in some reservoirs, then we will be getting the water that is lower in oxygen. Even then it varies from day to day.

To get a real bad circumstance, just assume we are thinking about Labor Day weekend, where we would have our plants shut down to very low flow for power, low flow in the river below the dam, a hot, humid weather condition, maybe cloudy with no wind action to stir up the reservoir in any way. You can visualize a hot, muggy Labor Day weekend. That's the kind of a time you can get in trouble.

I believe that is about the circumstance that we had when we had one difficulty down there. As I say, this doesn't ~~occur~~ all the time.

We have the dam instrumented now to keep track of the oxygen and the temperature and our flows. We know when we are going to have a low flow period. We are on the watch for that. If we see these things developing, we intend to take whatever measures we can at the moment -- and if more are necessary, we will take those into consideration -- to alleviate and prevent or correct the situation so that we won't have these extremes developing. This is in the case of a dam like Walter F. George that is existing.

As to those that are under study, we are taking these things into account as we plan the reservoir now, to take whatever measures we can to prevent this from occurring.

As I say, for Walter F. George our position is one of surveillance to keep track of things and to try to prevent it from happening now.

I am sure Mr. Kittrell will have further amplification on this.

CHAIRMAN STEIN: Thank you.

Are there any further comments or questions of the General?

(No response.)

If not, thank you very much.

MR. ROGERS: One question.

CHAIRMAN STEIN: Yes.

MR. ROGERS: General Walker, I would like to raise a question on the Fort Benning secondary treatment you mentioned. How about chlorination?

GENERAL WALKER: I believe that is chlorination too, isn't that correct, Charley?

MR. CHARLES F. TRAINA: Yes.

MR. ROGERS: It is secondary treatment and chlorination?

GENERAL WALKER: Yes.

CHAIRMAN STEIN: Thank you very much.

Mr. Kittrell, do you want to say something, or do you have a comment on this problem here? This is F. W. Kittrell, chief of our stream studies operation. And he, as you can tell when he begins to talk, is not from Maine. He is from TVA country. Mr. Kittrell.

STATEMENT OF

F. W. KITTRELL, CHIEF, POLLUTION
EVALUATION UNIT, ROBERT A. TAFT
SANITARY ENGINEERING CENTER,
CINCINNATI, OHIO.

MR. KITTRELL: Well, Mr. Stein, I think the subject has been pretty well covered. I don't think we can be specific about what actual remedies might apply in this particular situation, because the situation has not been examined with that in mind. Each situation is an individual problem that requires a good engineering study to determine what is the best solution.

There are a number of possible steps that might be taken, most of which involve some additional construction if these steps are not taken when the dam is constructed

One Mr. West has mentioned. That is an overflow weir. This consists of a dam above the existing dam which rises within, oh, 30 or 20 feet of the surface and which permits only water from the top stratum, which is well-oxygenated to go over this upstream weir.

This has proved to be effective on the Roanoke Rapids Dam in North Carolina where a power company actually went in after the dam was installed and put in this type of weir. It apparently has been quite successful in assuring adequate dissolved oxygen in the water below Roanoke Rapids Dam.

This also was planned on a dam constructed by the Duke Power Company on the Catalpa River in North Carolina. I have not heard any of the results of this installation there. I don't know how successful it was, but I think there is every reason to believe that it also would have been as successful as the Roanoke Rapids installation.

This was built when the new dam was built. I mean it was part of the total construction at that time.

There are other possibilities. Milo Churchill of TVA, who was mentioned here, suggested that, instead of an earthen or rock-filled weir such as we are talking about, possibly a membrane, plastic membrane or rubber, might be installed in place of an earthen weir. It seems that this should be quite a bit cheaper probably than the necessary dirt that would have to be hauled and placed in the reservoir itself. I see no reason why it shouldn't be effective.

Work has been done at the Robert A. Taft Sanitary Engineering Center on elimination of stratification through pumping. By installing the pumps with relatively large capacity, but operating against a very low head, the cold water is pumped from the bottom of the reservoir, discharged into the surface stratem, and it destroys the temperature stratification and increases dissolved oxygen at the lower levels of the reservoir.

This has proved to be surprisingly effective in a number of relatively small lakes on which it has been tried thus far. I don't know the exact percentage, but the power consumption has only been something like 10 per cent of that which was anticipated when they started this experimental work. They thought they would have to pump the entire volume of cold water from the bottom of the reservoir and mix it with the surface water. However, they found that much less than the entire volume of cold water has to be pumped.

Apparently the currents set up by introducing the cold water into the upper warm water in themselves bring about mixing which they had not anticipated. So much less pumping is required than they had thought when they started this work.

Other measures have been tried at Roanoke Rapids

Dam before the weir was installed there. One of these was to introduce air into the penstocks of the turbines. This, of course, resulted in some reduction of power efficiency of the turbines. Personally, I haven't been too impressed by the accomplishments of this method.

Another method is to install compressed aeration below the dam where the water comes out and introduce oxygen in the water below the dam. There again efficiencies have been rather low and I think not too impressive.

But these, in general, cover the general methods that might be available at the present moment.

CHAIRMAN STEIN: Mr. Kittrell, here is the point we are faced with as conferees, and I think in this case I may be speaking for the States too. I am sure that you and the Corps can lick the problem if you get to work on it. The question here is that Mr. West talked about stabilization. I wonder if we can get from you people a point in time when we are going to decide whether the operation of the reservoirs on the Chattahoochee River, the Walter F. George Reservoir and so forth, is going to stabilize and not present a problem, or when we are going to have to get down to business and recommend some kind of remedial action.

Now, how long will that take until we are able to determine this? Because, presumably, as administrators, we are going to have to determine the time schedule for the cities and the industries.

By the same token, I think we are going to have to have some kind of notion of what we are going to do about the reservoir discharges.

When can that happen?

MR. KITTRELL: Well, I'm not too optimistic that there will be total correction of this condition through aging of the reservoir. I think unquestionably there should be some improvement after the first two to three years, because a good portion of the organic matter on the bottom should be stabilized in two to three years.

However, in the TVA reservoirs we found that oxygen depletion in the bottom of the reservoirs was related more directly to the richness of the water, the amount of nutrients that would support algae and plankton in the water, because the richer the water, the greater the population of algae and plankton which the water supports.

These organisms die in the surface layer, settle to the bottom layer, the cold layer, and decompose. This is the major cause of oxygen depletion in most of the TVA reservoirs.

CHAIRMAN STEIN: If I understand you, again just from an operational point of view, your recommendation would be that, if we are going to correct this problem, can't someone begin looking at corrective measures right now and not expect nature to handle this by itself?

MR. KITTRELL: I think it would be well to start looking at them. How long has this reservoir been in, incidently, already?

MR. WEST: I think it is 1962.

GENERAL WALKER: 1962.

MR. KITTRELL: Four years. I would not anticipate a great deal of further improvement after four years in so far as the oxygen at the bottom is concerned.

CHAIRMAN STEIN: Thank you. Your statement has been very helpful, to me anyway.

Are there any comments or questions?

(No response.)

If not, thank you very much, Mr. Kittrell.

I don't want to stop this without giving the Corps the last word on this problem, if you would like it.

GENERAL WALKER: If I may, sir.

CHAIRMAN STEIN: Yes.

GENERAL WALKER: I would suggest that we be sure that we are placing this in the proper perspective so far as the total question of pollution of the river is concerned.

These pollutants from sewage and industrial wastes, and so forth, are a year-around proposition. What we are talking about on this low oxygen content is a few days a year. Now, I'm not in any sense being negative about out intention to improve it where it is practicable to do so, but I say again it is necessary for us to get a proper handle of the value of the investment which you are asking the taxpayers to put out in these reservoirs.

CHAIRMAN STEIN: General, I couldn't agree with you more. As you know, I wrestle with this problem all the time; we have the same problem. I think this is the problem we are facing with the States and with these communities. We have had that same difficulty with the Federal installations a long time, and I have been working with you on that.

GENERAL WALKER: Yes sir.

CHAIRMAN STEIN: The States and the cities have asked us to clean up the Federal installations, and I think you are doing a magnificent job, as was indicated at Fort Benning.

When we started this, we found we had a fraction of the pollution problem in the United States. At the beginning, when the committee did a survey, we found, out of the 23,000 Federal installations, we just had 60 with problems -- real problems. Some of them were in very remote areas.

I agree with your perspective on the reservoirs.

I would not equate that with the effect on the river of some of these big industrial or municipal polluters.

GENERAL WALKER: Yes.

CHAIRMAN STEIN: However, the question we are always faced with is this: When we ask the States and the municipalities and the industries to spend millions of dollars to clean up pollution, they always come back to us with this -- with the Federal Government we have to be purer than Caesar's wife and have to put our own house in order. I think that a good portion of that goes with our problem.

I think your point is very well taken that the effects of discharges from the reservoirs on the river may be intermittent, and the weather conditions may have to be just right.

The General's attitude reflects the attitude of the Corps of being ready to grapple with this problem and deal with it. And I think, if there is no objection from the Corps, that we might begin looking at this problem pretty soon after the conference.

GENERAL WALKER: Quite. I think we are in agreement on this. Mr. Stein.

CHAIRMAN STEIN: Yes.

GENERAL WALKER: I thoroughly agree with your point that we in the Federal agencies have to do our share and perhaps a little more. And I support that.

Incidentally, in that connection, I should say that we have already taken rather expensive and drastic steps to clear up our water craft on the rivers. Those that are Federally-owned now have a water purification or sewage disposal facility on them.

I almost got demoted by some of the fine citizens of the area when we imposed a restriction on the recreational craft on our reservoirs. I must say that I think we moved a little too far too fast there, and we have backed off and are reconsidering that to comply with the State of Georgia's regulations. I think that this will work out quite well.

CHAIRMAN STEIN: Thank you very much.

Are there further comments or questions before we recess for lunch?

(No response.)

If not, thank you very much. I think we are proceeding very well and pretty much on schedule. We will reconvene at 2 o'clock.

(Whereupon, at 12:22 p.m., the luncheon recess was taken.)

AFTERNOON SESSION

2:08 p.m.

CHAIRMAN STEIN: May we reconvene?

Mr. Rogers.

MR. ROGERS: Let me continue with the other Federal agencies. We have several others here that are with us. Let me go down the list and see if they have a prepared statement.

We have Mr. Seaborn Lawrence, representing Mr. Charles Levy, Administrator for the Southeast Power Administration. Is he here this afternoon?

MR. SEABORN LAWRENCE: Yes.

MR. ROGERS: Do you have a statement, Mr. Lawrence?

MR. LAWRENCE: No. I have no statement.

MR. ROGERS: Mr. A. N. Cameron, District Chief of the Geological Survey, Department of Interior. I saw Mr. Cameron outside. Did he come in?

A MEMBER OF THE AUDIENCE: He was here this morning. He had to leave.

MR. ROGERS: He indicated he did not have a statement.

Is anyone else representing the Geological Survey?

(No response.)

Mr. Gerald Hansler representing Mr. Howard

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Chapman, Associate Regional Health Director for DHEW. Gerry, do you want to make any statement?

MR. GERALD HANSLER: I don't think so. The data and views developed in the report that Mr. West gave were done when water pollution was in the Public Health Service. So DHEW has no formal statement now.

I think the Public Health Service through DHEW will continued to be interested in the health aspects of the pollution of the Chattahoochee River.

MR. ROGERS: Thank you, Gerry.

Mr. Ellis Diseker from the Agricultural Research Service, Department of Agriculture. Do you have a statement?

MR. ELLIS DISEKER: I do not have a statement, sir, unless there is some question I may be able to answer.

MR. ROGERS: All right. Thank you, sir.

Have I missed any other Federal agencies?

(No response.)

We do have one inter-state representative here representing the Resources Advisory Board, Mr. Clarence M. Conway, who is Executive Director of the Resources Advisory Board, Southeast River Basins.

Mr. Conway, do you have a statement?

MR. CLARENCE M. CONWAY: Mr. Rogers, I do not have a formal statement at this time. As you well know, we are profoundly interested in the water resources development of the Southeast River Basins and particularly interested in this problem that you have.

MR. ROGERS: Thank you, Mr. Conway.

I don't believe there are any other Federal agencies at this time. I turn it back to you, Mr. Chairman.

CHAIRMAN STEIN: Thank you, Mr. Rogers.

We will now call on Alabama. Dr. Myers.

DR. MYERS: Mr. Chairman, for Alabama's statement on behalf of the Alabama Water Improvement Commission, I would like to ask Mr. Joseph Crockett, who is Director of the Technical Staff of the Alabama Water Improvement Commission, to present our statement for the Commission.

Mr. Crockett.

STATEMENT OF

JOSEPH L. CROCKETT, JR., DIRECTOR,
TECHNICAL STAFF, ALABAMA WATER
IMPROVEMENT COMMISSION.

MR. CROCKETT: Mr. Chairman, Conferees, ladies and gentlemen: Is this mike working all right this afternoon? Some people said they couldn't hear very well this morning.

Mr. Chairman, a copy of our statement has been given to the Reporter. It contains some material which I will not read, and I would like to ask that it be incorporated in the record of this conference.

CHAIRMAN STEIN: Without objection, it will be incorporated as if read.

Go ahead, Mr. Crockett.

MR. CROCKETT: The Alabama Water Improvement Commission recognizes that pollution of interstate waters of the Chattahoochee River exists for which abatement measures should be taken and that sources within Alabama contribute to this pollution.

Surveys and investigations of water quality in the Chattahoochee River by the then Department of Health, Education, and Welfare reveal this pollution, especially with respect to the degree of bacterial contamination. Similar conditions have been found by the Commission in the past.

Notwithstanding factual demonstrations of pollution of an interstate character, the Commission was surprised when the Federal Water Pollution Control Administration chose to initiate steps leading to enforcement action at this particular time. Had the decision been made a year ago, neither the Commission nor its staff would have been taken by surprise. On the other hand, it was not expected that a conference on the Chattahoochee River would be called until the States of Alabama and Georgia and the Federal Water Pollution Control Administration had complied with provisions of the Federal Water Pollution Control Act, as amended, relating to the establishment of standards for interstate waters.

It now becomes a question as to whether this Conference will establish standards of water quality for the Chattahoochee River or if they will be defined and promulgated in the manner prescribed by Federal law.

Another point of fact is that the States involved in this Conference are taking actions to abate pollution of the stream involved. Then, too, the quite significant addition of workload brought upon the States by the necessity to hold public hearings and develop water quality criteria, in a relatively short period of time, certainly does not invite extra activities on the part of the respective State water pollution control agencies.

The results of surveys and investigations of water quality in the Chattahoochee River from West Point, Georgia to Fort Gaines, as resported by the U. S. Department of Health, Education, and Welfare, particularly with respect to bacterial concentrations, show conditions which would be expected in view of the quantity of sewage discharged to this segment of the stream and existing conditions of sewage treatment.

It is interesting to note that conditions of dissolved oxygen in the river between West Point and

Walter F. George Lock and Dam are satisfactory in the flowing reaches of the river and upper waters of its impoundments. Dissolved oxygen deficiencies reported in bottom waters of the impoundments are the rule rather than exception for such waters. The absence or low concentrations of dissolved oxygen in the lower depths of reservoirs is not necessarily an indication of pollution, as these conditions exist in reservoirs which are free of man-made waste products.

It appears, therefore, that the basis for action under the provisions of the Federal Water Pollution Control Act on the Chattahoochee River between West Point and Walter F. George Lock and Dam is founded on bacteriological quality rather than other characteristics.

Notwithstanding this presumption, the Alabama Water Improvement Commission recognizes that pollutional materials which, in themselves, primarily affect dissolved oxygen must be adequately treated to preserve the quality of water in the Chattahoochee River for uses in the foreseeable future. This position also applies to those wastes which, because of their toxic nature, their appearance or solids concentrations affect or may affect reasonable and beneficial uses of the present and the future.

The Alabama Water Improvement Commission takes no exceptions to the recommendations in the report of the Department of Health, Education and Welfare with respect to the degree of treatment which should be given to domestic sewage and industrial waste, nor is it in disagreement with the recommendation for the abatement of pollution in combined sewer systems and the separation of sanitary sewage from such systems.

As a practical matter, however, it is not felt that bacteriological analyses should be required as a plant control test for all sewage treatment plants but rather a recommendation to be applied where the size of the plant may justify the performance of such tests as a routine plant operational procedure.

The report of the Department of Health, Education, and Welfare lists 5,000 coliform bacteria per 100 milliliters as the commonly accepted upper limit for waters used as a source of treated domestic water supply and for boating, fishing and general recreation. It also lists 1,000 coliform bacteria per 100 milliters as the commonly accepted upper limit for swimming, skiing and other water-contact sports.

The inference given in the report is that the figures expressed above are maximums rather than monthly averages. More recent approaches to definitions of bacteria densities in water quality criteria have used these figures as monthly averages with limitations as to the maximum individual value which should be permitted. These approaches also consider the type of bacteria with respect to origin and appear more practical in terms of present-day scientific knowledge and technology than older methods.

The Commission is justly proud of the progress made through the provision of adequate sewage treatment plants by municipalities in Alabama situated on the Chattahoochee River. It can also point with pride to the plans of West Point Manufacturing Company for the treatment of industrial wastes and domestic sewage originating on its properties. The offer of this company to include the Cities of Lanett, Alabama and West Point, Georgia in its planning for waste treatment is a singular action and one seldom encountered on the part of an industrial corporation. There is little doubt but that this commendable approach by the company will expedite the abatement of pollution in the Lanett-West Point area.

The Commission also desires to inform this Conference of the highly successful arrangement mutually developed between the Commission, the Georgia Water Quality Control Board and Alabama Kraft Company for handling the matter of waste disposal from Alabama Kraft's paper mill now under construction on the Chattahoochee River at Mahrt, Alabama. The agreement between the water pollution control agencies of Alabama and Georgia is an example of the outstanding cooperation and mutual involvement of these States on matters of interstate water pollution.

A reproduction of the agreement between Alabama and Georgia on the matter of waste disposal by Alabama Kraft Company is appended to the statement of the Commission and submitted as part of the record of this Conference. There is also appended to this statement a review of the status of waste treatment in the basin of the Chattahoochee River within Alabama and upstream from Fort Gaines, Georgia.

(The Joint Agreement between the State of Georgia Water Quality Control Board and the State of Alabama Water Improvement Commission, above referred to, follows:)

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JOINT AGREEMENT
BETWEEN
THE STATE OF GEORGIA WATER QUALITY CONTROL BOARD
AND
THE STATE OF ALABAMA WATER IMPROVEMENT COMMISSION

- - -

THIS AGREEMENT, made and entered into this 1st day of April, 1965, by and between the GEORGIA WATER QUALITY CONTROL BOARD and the ALABAMA WATER IMPROVEMENT COMMISSION,

WITNESSETH:

WHEREAS, a study has been conducted by the GEORGIA WATER QUALITY CONTROL BOARD and the ALABAMA WATER IMPROVEMENT COMMISSION concerning the discharge of waste into the Chattahoochee River by the Alabama Kraft Company's Mahrt Mill located in the State of Alabama, and

WHEREAS, the parties hereto desire to enter into an Agreement regarding waste treatment requirements, issuing of permits and surveillance of treatment facilities of the Alabama Kraft Company for its Mahrt Mill in the State of Alabama, and

WHEREAS, there is a need to provide a continuing basis for compliance with the requirements established by the GEORGIA WATER QUALITY CONTROL BOARD and the ALABAMA WATER IMPROVEMENT COMMISSION,

NOW, THEREFORE, in consideration for the mutual covenants contained herein, it is hereby agreed that:

1. The STATE OF ALABAMA WATER IMPROVEMENT COMMISSION will issue a permit as authorized by law to discharge waste into the Chattahoochee River to the Alabama Kraft Company's Mahrt Mill located in the State of Alabama under conditions mutually acceptable to the STATE OF GEORGIA WATER QUALITY CONTROL BOARD and the STATE OF ALABAMA WATER IMPROVEMENT COMMISSION;

2. The STATE OF ALABAMA WATER IMPROVEMENT

COMMISSION will exercise regulatory authority over the operation of the waste treatment and disposal system of Alabama Kraft Company's Mahrt Mill;

3. The STATE OF ALABAMA WATER IMPROVEMENT COMMISSION will require the regular submission by said Mill of operating reports, reports of water quality analyses and such other reports as required by the respective State Agencies for the purposes of water quality control; copies of all such reports submitted to the STATE OF ALABAMA WATER IMPROVEMENT COMMISSION by Alabama Kraft Company shall be transmitted by the said Commission to the STATE OF GEORGIA WATER QUALITY CONTROL BOARD:

4. The STATE OF GEORGIA WATER QUALITY CONTROL BOARD and the STATE OF ALABAMA WATER IMPROVEMENT COMMISSION shall independently, or jointly, conduct such studies and investigations of the Chattahoochee River for the protection of the quality of waters of their respective States as such quality of waters may be affected by the Alabama Kraft Company; reports of such studies and investigations made by either State Agency shall be transmitted immediately to the other;

5. This instrument covers all agreements and stipulations between the parties hereto relating to the subject matter hereof and no representations nor statements, written or oral, made or purported to have been made by

any person and not contained herein shall modify, add to or alter the express terms hereof;

6. This Agreement shall become effective on the day and year first above written.

GEORGIA WATER QUALITY CONTROL BOARD

By "John H. Venable, M.D." (Signed)
CHAIRMAN

ALABAMA WATER IMPROVEMENT COMMISSION

By "Ira L. Myers, M.D." (Signed)

CHAIRMAN

APPROVED ON THIS THE 15

DAY OF APRIL, 1965,

AT MONTGOMERY, ALABAMA:

"George C. Wallace" (Signed)
GEORGE C. WALLACE, AS GOVERNOR
OF THE STATE OF ALABAMA.

ATTEST:

"Mrs. Agnes Baggett" (Signed)
SECRETARY OF STATE, STATE OF
ALABAMA

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MR. CROCKETT (Continuing): In summary, the Commission's position is as follows:

1. It agrees that interstate pollution, particularly of a bacterial nature, exists in segments of the Chattahoochee River between the Lanett-West Point area and Fort Gaines.

2. It contends that commendable progress has been and is being made in Alabama to abate and control pollution of the Chattahoochee River.

3. It strongly feels that the timing of the conference is inappropriate and that the States of Alabama and Georgia should have been given the opportunity to proceed with the establishment of standards under the provisions of the Federal Water Pollution Control Act, as amended. If either or both of the States fail to fulfill their obligations, then a conference would seem to be in order.

STATUS OF WASTE TREATMENT IN THE BASIN OF THE CHATTAHOOCHEE RIVER WITHIN ALABAMA AND UPSTREAM FROM FORT GAINES

A. DOMESTIC SEWAGE

1. Lanett

The City of Lanett has under consideration a plan which would provide joint treatment of domestic sewage from Lanett, West Point and domestic sewage and industrial waste from the Lanett Mill of West Point Manufacturing Company. This plan, being developed by West Point Manufacturing Company, a division of West Point-Pepperell, Inc., provides for secondary treatment of combined wastes, followed by chlorination, and has been approved, in principle, by the staffs of the Alabama

Water Improvement Commission and Georgia Water Quality Board. Planning is progressing on a schedule which, barring unforeseen difficulties, contemplates completion of treatment facilities during 1968.

We were informed this morning by telephone conversation with the City Clerk of Lanett, Alabama that the City Council of Lanett had met yesterday and approved a proposal to join with West Point Manufacturing Company and West Point Georgia in the provision of sewage treatment facilities as a joint enterprise.

2. Fairfax, Langdale, River View and Shawmut

West Point Manufacturing Company owns and operates the domestic sewage systems serving these unincorporated communities on the Chattahoochee River just below the point the Chattahoochee becomes the boundary between Alabama and Georgia. The company has authorized its engineers to design a treatment facility to serve these communities and to treat industrial wastes from the company's mills within them. A proposal, based on secondary treatment and chlorination, has been approved by the staffs of the Alabama Water Improvement Commission and the Georgia Water Quality Board. Engineering design is under way and construction of the plant is tentatively scheduled for completion late in 1967.

3. Phenix City

The City of Phenix City is served by a secondary sewage treatment plant completed during October 1964. This plant has facilities for chlorination and monthly operational reports reveal that the effluent is being chlorinated to an acceptable degree.

4. Eufaula

The City of Eufaula completed construction of a sewage stabilization lagoon, a secondary treatment device, during August 1965.

5. Roanoke

The City of Roanoke is constructing a sewage stabilization lagoon and outfall sewer system which will remove and treat sewage presently discharged, untreated, to Cuss Creek, a tributary of Wehadkee Creek which is a tributary of the Chattahoochee River. This relatively small flow, 0.03 MGD, will be combined with other sewage flows from the city for treatment and discharge to a tributary of the Tallapoosa River.

6. Lafayette

The City of Lafayette discharges approximately 0.08 MGD and 0.09 MGD of untreated sewage to Allen and Kellum Hill Creeks, respectively, at points approximately 16 miles from the Chattahoochee River. These streams are tributaries to Osligee Creek which is a tributary of the Chattahoochee River. An engineering study for secondary treatment of sewage from the city has been completed but has not been placed in effect. Further action by the Alabama Water Improvement Commission is planned.

7. Hurtsboro

The Town of Hurtsboro has been directed by the Alabama Water Improvement Commission to construct a secondary treatment plant. Approximately 0.07 MGD of untreated sewage is presently discharged to Hurtsboro Creek, a tributary of Cowikee Creek which is a tributary of the Chattahoochee River. The discharge is located approximately 25 miles from the river. Engineering for this project is presently under way.

8. Blessed Trinity Retreat

Blessed Trinity Retreat is a summer encampment located in Russell County near Holy Trinity. A sewage stabilization lagoon is provided for treatment of the maximum expected flow of 0.02 MGD. The discharge from this lagoon is to an unnamed tributary of the Chattahoochee River, which enters the river near River Mile 124.8. The discharge is approximately 1½ miles from the Chattahoochee River.

9. Eufaula Air Force Station

The Eufaula Air Force Station, located in Barbour County, Alabama, discharges effluent from a secondary sewage treatment facility to Barbour Creek, a tributary of the Chattahoochee River.

B. INDUSTRIAL WASTES

1. West Point Manufacturing Company

As mentioned in the discussion of domestic sewage, West Point Manufacturing Company is well under way with its planning for treatment of industrial wastes and expects to complete all necessary facilities for this purpose by the latter part of 1968.

2. Alabama Kraft Company

Alabama Kraft Company is constructing a paperboard mill on the Chattahoochee River at Mahrt in Russell County, Alabama. Secondary treatment facilities designed to accomplish a reduction in BOD of approximately 85 per cent and a 70-day waste retention basin is being constructed by the company in accordance with plans approved by the Alabama Water Improvement Commission and Georgia Water Quality Board. The contribution of BOD from this source is expected to be in the range of 4,200 pounds per day on the average. Conditions placed upon this waste discharge by the respective State agencies are those compatible with downstream recreational uses. The discharge to the river will be made through a submerged diffuser at or about River Mile 117.0.

Mr. Chairman, that completes the prepared statement of the Water Improvement Commission of Alabama.

CHAIRMAN STEIN: Thank you, Mr. Crockett.

Are there any comments or questions?

Mr. Rogers.

MR. ROGERS: How about River View? Is it in one of these other communities?

CHAIRMAN STEIN: Would you speak into the microphone?

MR. ROGERS: Is the community of River View involved in any of these proposed city plans of Lanett and West Point?

MR. CROCKETT: If I missed River View when I read Fairfax, Langdale, River View and Shawmut, it was an error on my part. It is in the report.

CHAIRMAN STEIN: Are there any further questions or comments?

(No response.)

You know, Mr. Crockett, I'm glad to see that the stars that fell on Alabama are not yet dissipated. Your report is wonderful. But, you know, you say on page 1 that you would not expect that a conference on the Chattahoochee River would be called until the States of Alabama and Georgia had complied with the provisions of the Federal Act relating to the establishment of standards, even though the Federal Act went on to say, and the report following the Act went on to say, that we would continue enforcement even without the standards. I know that you view that with alarm.

On page 3 you say you can also point with pride to the plans of West Point Manufacturing Company. I would really be disappointed if I came to Alabama and I found that you couldn't view with alarm, when the Federal Government took action, and point with pride.

(Laughter.)

MR. CROCKETT: We always "view with alarm."

(Laughter.)

CHAIRMAN STEIN: Then you have another one that I really like here, Joe. This is terrific. By the way, I don't want the name of the company to be pointed out, but it is B on your page. "As mentioned in the discussion of domestic sewage, X Manufacturing Company is well under way with its planning for treatment of industrial wastes and expects to complete all necessary facilities for this purpose by the latter part of 1968." That's wonderful for that company.

But for the Federal installation that is already providing secondary treatment, here's what your report says: "The Eufaula Air Force Station, located in Barber County, Alabama, discharges effluent from a secondary sewage treatment facility to Barber Creek, a tributary of the

Chattahoochee River."

Now, I like the choice, you know, of one that is planning and one that is already providing treatment.

MR. CROCKETT: May I remark on this?

CHAIRMAN STEIN: Yes sir.

MR. CROCKETT: We found our records on the Eufaula Air Force Base to be rather scant. As a matter of fact, they are confined to the publicity that came out listing Federal installations. I think this is one of the few Federal installations that were missed in the inventory carried out by the Federal Water Pollution Control Administration.

They are doing a good job. I didn't know enough about it to talk about it.

CHAIRMAN STEIN: Right.

Are there any other comments or questions?

MR. RADEMACHER: I had one comment, Mr. Stein.

CHAIRMAN STEIN: Yes.

MR. RADEMACHER: On page 3, the first paragraph, Mr. Crockett, you indicate that you shouldn't have plant control tests except in larger plants. How does the State of Alabama plan to monitor or to keep under surveillance plants that are operating?

I assume that you have problems just like many other States around the country in the operation of plants in getting good effluent out of these plants.

MR. CROCKETT: I really appreciate that question, because in an attempt to keep this report as condensed as possible I did not expand on that.

We simply don't want the impression to be gained that every plant, regardless of its size, must have the elaborate laboratory facilities necessary to do bacteriological examinations. We have plants serving communities of 1,000 and 1,500 and going up to 2,000. There will be plants that will serve less than that.

To be I think very frank, the equipment of a laboratory to perform bacteriological analyses and the staffing of that laboratory with competent personnel acquainted with the procedures and techniques are just impractical.

So you ask how we would attempt to do that. I think we all recognize that the methods of sewage treatment, particularly secondary sewage treatment, in practice today give you within a range a fairly predictable degree of bacterial removal. I am afraid that for some time to come we may have to depend upon that until we are able to provide some sort of bacterial monitoring service and not expect it to be provided by these very small communities and, let's say, private sewage treatment developments.

MR. RADEMACHER: Thank you very much.

CHAIRMAN STEIN: Are there any further questions or comments?

(No response.)

Dr. Myers.

DR. MYERS: We have one other presentation.

Let me say to you and to the other Conferees that, upon receiving notice, we did notify the industries in Alabama that were making contributions to this stream. We also notified municipalities and offered them an opportunity to be heard at this time.

There is one group that are in the process of making the most progress and one that we have been able to commend. We will continue to commend those that are working toward the solution of their problems. We accept those that have already solved their problems, but we are most complimentary of those working toward a solution. This is a method of operation, and it is something I think we are very proud of.

Mr. Herman Grandberry, the manager of the Engineering-Service Division of West Point Manufacturing Company, has a presentation and would like to be heard. We certainly would like to hear from him, because he has information that will be news I think even to us.

The fact we had this one telephone call this morning is an indication of the progress that is being made in that area.

So, Mr. Granberry, if you will come forward, we will be glad to hear you.

STATEMENT OF

HERMAN GRANBERRY, MANAGER, ENGINEERING-
SERVICE DIVISION, WEST POINT-PEPPERELL,
INC., WEST POINT, GEORGIA.

MR. GRANBERRY: Mr. Chairman, I am Herman Granberry, manager of the Engineering-Service Division, West Point-Pepperell, Inc. -- a textile manufacturing concern with headquarters in West Point, Georgia, and with operations in Georgia, Alabama, South Carolina, and Maine.

We have been asked by the Alabama Water Improvement Commission to present a statement to this Conference on the status of our pollution control effort in Alabama as it affects the Chattahoochee River and its tributaries over the Atlanta-Fort Gaines area. It is our pleasure to do so at this time.

We are members of both the Alabama and Georgia Textile Manufacturers Associations. The Alabama Textiles Association represents some 75 textile manufacturing plants with about 40,000 people. In Georgia textiles is the largest industry, with 105,000 persons employed in

175 member textile plants located in 66 of Georgia's 159 counties and with payrolls of $450 million per year.

Both State associations have adopted formal statements on the matter of water pollution. I have copies of these statements which I would like to introduce as a part of the record at this time. I also have extra copies for anyone who may be interested in having one.

CHAIRMAN STEIN: Do you have a copy of that statement with you, Mr. Granberry?

MR. GRANBERRY: Would you like one?

CHAIRMAN STEIN: How big is that statement? How many pages is it? I would like to see. Is that all it is?

MR. GRANBERRY: It is one page.

CHAIRMAN STEIN: Let's put it in the record as if read.

MR. GRANBERRY: There is one page for Alabama. I believe there are two for Georgia and for some comments.

CHAIRMAN STEIN: That is all right. We will put them in.

MR. GRANBERRY: Shall I read them?

CHAIRMAN STEIN: Not unless you wish. But if you wish, you may read them.

MR. GRANBERRY: I care not to read them.

CHAIRMAN STEIN: That will appear in the record completely.

MR. GRANBERRY: Thank you.

(The documents referred to follow:)

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Resolution passed at the Annual Meeting of the Alabama Textile Manufacturers Association at the Thursday Morning Business Session, May 5, 1966.

Resolution No. 4:

WHEREAS, one of Alabama's most valuable assets is its abundant supply of both surface and underground water;

The proper utilization and the careful preservation of our water resources are vital to the personal well-being of Alabama citizens, and to the continued growth and prosperity of our State;

The heavy concentration of population in our urban and metropolitan centers, together with the extensive industrialization that has taken place in Alabama in recent years, have caused a tremendous increase in the annual consumption of water in this State; and the disposal of the larger quantities of the wastes from our cities and from our industries, unless carefully controlled, threaten to impair the quality of our water for ourselves and for posterity;

The textile manufacturing industry is one of the large consumers of water in Alabama, consequently its waste disposal problems are of considerable magnitude;

The members of the Alabama Textile Manufacturers Association recognize their responsibilities as good corporate citizens, to conserve and to protect our water resources through judicious use of their water requirements, and through waste disposal methods and techniques that will effectively present the pollution of the streams into which their plant effluents are discharged;

The textile industry cannot eliminate its wastes from Alabama streams without difficulty. Experience has shown us that this is an expensive and highly technical process. The industry does say that they have begun and will continue the march that will result in cleaner streams for Alabama, for Alabamians, and for those neighbors of ours downstream from us;

By this resolution, we, the members of the Alabama Textile Manufacturers Association, pledge our best efforts to fulfill that promise by establishing and maintaining water use and waste disposal practices that will contribute to the preservation of the water resources of our State by all its people;

Because of the very heavy capital investment required to build and to maintain effective waste treatment plants, the members of our Association, representing some 75 textile manufacturing plants, with 40,000 employees, respectfully urge the Congress of the United States and the Legislature of Alabama to enact national and State legislation that will allow for the accelerated tax depreciation of the facilities which are designed to control water pollution, and to provide other tax incentives that will encourage the construction of such plants and facilities as promptly as possible.

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RESOLUTION

ADOPTED UNANIMOUSLY BY THE

GEORGIA TEXTILE MANUFACTURERS ASSOCIATION, INC.

April 22, 1966 -- 66th Annual Meeting

Boca Raton, Florida

One of Georgia's most valuable assets is its abundant supply of both surface and underground water.

The proper utilization and the careful preservation of our water resources are vital to the personal well-being of Georgia citizens and to the continued growth and prosperity of our State.

The heavy concentration of population in our urban and metropolitan centers, together with the extensive industrialization that has taken place in Georgia in recent years, have caused a tremendous increase in the annual consumption of water in this State.

And the disposal of the larger quantities of the wastes from our cities and from our industries, unless carefully controlled, threaten to impair the quality of our waters for ourselves and for posterity.

The textile manufacturing industry is one of the largest consumers of water in Georgia. Consequently, its waste disposal problems are of considerable magnitude.

The members of the Georgia Textile Manufacturers Association, Inc., recognize their responsibilities, as good corporate citizens, to conserve and to protect our water resources through judicious use of their water requirements, and through waste disposal methods and techniques that will effectively prevent the pollution of the streams into which their plant effluents are emptied.

In a public statement made to the Georgia Water Quality Control Board on October 7, 1965, John T. Newton, Chairman of the GTMA Committee on Water Use and Waste Disposal, said in part:

"The textile industry is not saying that it can eliminate its wastes from Georgia streams without difficulty. Experience has shown us that this is an expensive and a highly technical process. The industry does say that it, in cooperation with the Georgia Water Quality Control Board, has begun and will continue the march that will result in cleaner streams for Georgia, for Georgians, and for those neighbors downstream from us."

By this resolution, we, the members of the Georgia Textile Manufacturers Association, pledge our best efforts to fulfill that promise by establishing and maintaining water use and waste disposal practices that will contribute to the preservation of the water resources of our State by all of its people.

Because of the very heavy capital investment required to build and to maintain effective waste treatment plants, the members of our Association, representing some 175 textile manufacturing plants, with 100,000 employees, respectfully urge the Congress of the United States and the General Assembly of Georgia to enact national and State legislation that will allow for the accelerated tax depreciation of the facilities which are designed to control water pollution, and to provide other tax incentives that will encourage the construction of such plants and facilities as promptly as possible.

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EXCERPTS FROM REPLIES RECEIVED FROM GEORGIA DELEGATION IN CONGRESS RELATIVE TO RESOLUTION PASSED BY GTMA ON WATER USE & WASTE CONTROL

FROM SENATOR RICHARD B. RUSSELL:

"I am sure you are aware of my deep interest in the problem of water pollution and I recently had the pleasure of delivering the dedicatory address on the opening of the Southeastern Water Pollution Research Laboratory at Athens, Georgia. I made an all-out fight to obtain funds for this facility in my position as a member of the Senate Committee on Appropriations, and I have high hopes that the work at this laboratory will contribute in large measure to the efforts made to find some solution for pollution problems.

"S. 3066, which provides for accelerated tax depreciation for water pollution facilities, has been introduced by Senator Ribicoff and referred to the Senate Finance Committee with no hearings scheduled presently. While I am not a member of this Committee, you may be assured that at such time as this matter comes before the Senate it will receive my very closest consideration, keeping your views and comments in mind."

FROM SENATOR HERMAN E. TALMADGE:

"I appreciate your thoughtfulness in bringing this matter to my attention and I commend the Georgia

Textile Manufacturers Association for their interest in the critical problem of water pollution.

"However, in view of the present instability in our economy, I do not think the Congress would be willing to consider tax favoritism for even such admirable construction efforts as water pollution control facilities and a defeat at this time would prejudice future efforts. You may rest assured that I will keep under advisement your feelings in this regard and at a more appropriate date revive my consideration thereof."

FROM 1st DISTRICT CONGRESSMAN G. ELLIOTT HAGAN:

"Thank you very much for your letter of May 11 with which you enclosed a copy of a resolution which was unanimously adopted at the 66th Annual Convention of your Association.

"I appreciate your sending me a copy of the Resolution and you can be assured it will receive my most careful attention."

FROM 3rd DISTRICT CONGRESSMAN HOWARD H. CALLAWAY:

"I think you have taken an extremely sound position, and I will do what I can to work for accelerated tax depreciation for investment in waste treatment facilities. I'll let you know what happens."

FROM 5th DISTRICT CONGRESSMAN CHARLES L. WELTNER:

"I greatly appreciate your sending me a copy of the Resolution which was passed at your 66th Annual Convention. As you know, I am very concerned about the problem of water pollution, and certainly will do my best to be of assistance to your Association."

FROM 6th DISTRICT CONGRESSMAN JOHN J. FLYNT, JR.:

"Let me acknowledge and thank you for your letter of May 11, 1966 with the enclosed resolution which was adopted at your 66th Annual Convention last month. This resolution is an act of good corporate citizenship in the public interest, and your Association is to be commended for such action.

"I agree that corporate investment in water conservation should be officially encouraged at both the State and national level, and that some tax benefits relating to expenditures therefore should be given the most serious consideration. You may be assured that I will work vigorously with you toward this goal."

FROM 7th DISTRICT CONGRESSMAN JOHN W. DAVIS:

"I certainly agree with you that the conservation of water is of vital importance to all of us. I assure you that I will give careful consideration to the proposal for accelerated tax depreciation for waste treatment facilities."

FROM 9th DISTRICT CONGRESSMAN PHIL M. LANDRUM:

"Let me acknowledge your letter of May 11th, with enclosure.

"I am pleased to have the resolution adopted by your membership and will study it."

FROM 10th DISTRICT CONGRESSMAN ROBERT G. STEPHENS, JR.:

"Thank you for your letter attaching a resolution adopted by your Association dealing with water use and waste control.

"H. R. 13653, H. R. 12455, H. R. 131362, and other bills, dealing with tax deductions, reimbursements of State and local funds, amendments to the Federal Water Pollution Control Act, et al, are pending before the Committee on Public Works. At the present time no action is scheduled. I will be glad to support this legislation and will be on the lookout for that committee's action."

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MR. GRANBERRY (Continuing): West Point-Pepperell believes in the letter and in the spirit of these statements or resolutions. We are actively engaged in doing something about them.

We feel that West Point-Pepperell's program typifies the good faith with which our industry is moving in both Alabama and Georgia. We are dedicated to the proposition that ". . . the proper utilization and the careful preservation of our water resources are vital to the personal well-being of the citizenry, and to the continued growth and prosperity of our States."

At West Point-Pepperell we have invested thousands of man-hours and many thousands of dollars studying this problem for more than five years.

We engaged the engineering firm of Charles T. Main, Inc., of Boston, Massachusetts, and Charlotte, North Carolina, 18 months ago (in February of 1965) to make a study of our waste water problems at Fairfax Mill.

Sixteen months ago (April 5, 1965) we asked this same firm to also start a study and include recommendations for treating waste water from all of our plants and from the cities of West Point, Georgia, and Lanett, Alabama, as well as from the towns of Shawmut, Langdale, Fairfax, and River View, Alabama.

The Chas. T. Main organization was also asked to make studies at other plants in South Carolina and Georgia, including our Newnan Mill Division at Newnan, Georgia.

The study of the waste problems in the Valley area near West Point has been completed. This was a two-year effort overall, paid for entirely by West Point-Pepperell, Inc. A report has been submitted to us by Chas. T. Main, Inc. recommending the construction of two treatment plants for a cost of approximately one million dollars. They would consist of secondary treatment with chlorination. One plant would be located near River View, Alabama, and designed to serve the mills and villages of Shawmut, Langdale, Fairfax, and River View. The other plant would be located at Lanett, Alabama, and would serve Lanett Mill and Lanett Bleachery & Dye Works and very possibly the Cities of West Point, Georgia, and Lanett, Alabama.

Three months ago (on May 6, 1966), we contracted with the the engineers to prepare final drawings and specifications for the treatment plant near River View, Alabama. They expect this engineering work to be completed this fall. The plant itself should be completed sometime in the fall of 1967.

We have discussed the results of the Chas. T. Main survey with officials from the Cities of West Point, Georgia, and Lanett, Alabama, and asked them if they would like to cooperate with West Point-Pepperell in the use of the treatment plant to be located near Lanett, Alabama. We believe this idea of working with these two cities is a good one and should result in economies for all parties concerned. However, with three parties involved, it understandably may take a little more time to develop the final plant and get it into operation.

Last month (on June 14) the West Point City Council voted to cooperate with West Point-Pepperell in the use of a treatment plant to be located near Lanett, Alabama, and also voted to engage Wiedeman and Singleton Engineers of Atlanta, Georgia, to work for the City of West

Point in designing a collecting and pumping system which would take waste to such a plant. The Lanett City Council has also voted to accept our offer, so this plant will be a cooperative effort.

We expect to proceed with the engineering design for the Lanett treatment plant as soon as the design for the River View plant is complete. This should be sometime this fall. The Lanett plant design should be complete by spring of 1967. If there are no unforeseen delays, the plant for the north end of the Valley should be put into operation by the spring or summer of 1968.

At Newnan Mill Division effluent is discharged into White Oak Creek, which enters the Flint River and empties into the Chattahoochee River. Since we began operating this plant we have been using oxidation ponds for treatment of the finishing plant waste water. These two lagoons have been working satisfactorily, but recent increases in plant capacity are overloading these lagoons at present, and we have asked Chas. T. Main, Inc., to make a study of this system and give us their recommendations. Their recommendations are that we use only one of the oxidation ponds and that we add aeration in order to increase its capacity.

The design work on this system has been completed and we are preparing to order the construction work which should begin this fall and be completed this fall or winter, depending upon delivery of equipment.

Our Columbus Mill, which is simply a greige mill with no finishing, is currently discharging waste into the Chattahoochee. Waste will be discharged into the proposed city treatment plant as soon as it is completed.

Our newest plant, under construction on Highway 1-85 near the Georgia-Alabama State line, is a $17-million expansion program for the manufacture of blended fabrics and sheeting. From the standpoint of waste water treatment it might be called self-contained. We are using a stabilization pond for oxidizing the waste before the effluent flows via Ossinippa Creek to the Chattahoochee.

It is evident, I'm sure, from the above summary that the work which has been done over the past several years,and which is still continuing, proves West Point-Pepperell is well aware of its waste water problems and has been working diligently in order to correct them. We are also assisting the villages and towns in which we operate with their problems in the form of engineering studies and offers for cooperative solutions to the problems.

At this time we should mention that we are, in all stages of this work, cooperating with the staff of the Alabama Water Improvement Commission and the staff of the

Georgia Water Quality Control Board. We are indebted to them for their splendid cooperation and help in analyzing these problems and in developing the means of solving them.

It has been estimated that the Chattahoochee Valley production units of West Point-Pepperell require seven million gallons of water per day. The treatment and disposal of this waste water will cost approximately $250,000 per year and will not add one cent to the value of our product.

West Point-Pepperell is dedicated to clean water and is doing something about it.

Thank you, Mr. Chairman.

CHAIRMAN STEIN: Thank you very much for your statement.

By the way, on the top of the last page, a clarification statement. What is a greige mill?

MR. GRANBERRY: I beg your pardon?

CHAIRMAN STEIN: The first sentence.

MR. GRANBERRY: The first sentence? "G-r-e-i-g-e" is the proper spelling I understand of "grey." It means not finished. It is sometimes corrupted into "grey" or "gray." But my secretary is correct.

CHAIRMAN STEIN: I'm sure she is.

MR. GRANBERRY: "Griege" is pronounced "grey."

CHAIRMAN STEIN: Thank you very much.

By the way, I would like to commend Pepperell on this statement. I think it is a magnificent one.

MR. GRANBERRY: Thank you.

CHAIRMAN STEIN: I think we have come a long distance since we had the last Conference in this area, possibly on the Coosa River, when Pepperell was also represented. I think we have come a long way.

MR. GRANBERRY: Thank you. We hope so. And we hope to continue with our progress.

CHAIRMAN STEIN: We can only go -- and I am speaking personally -- one more step. I understand your predilection for States' rights. I don't think that it applies in this area. There is enough work for us all to do. But in your last statement you say in all stages of the work you are cooperating with the staff of the Alabama Water Improvement Commission and the staff of the Georgia Water Quality Control Board. We regard this as an interim step.

You know, the oil and steel industries used to say that, but now they include us too.

MR. GRANBERRY: We didn't really mean to exclude you.

CHAIRMAN STEIN: I know you didn't want to go that far at this time. (Laughter)

Are there any comments or questions?

MR. RADEMACHER: Could I just ask one question, sir?

MR. GRANBERRY: Yes.

MR. RADEMACHER: What will the discharge be --

MR. GRANBERRY: We don't have this information yet. It is not fully developed. But we are willing to meet, and we will meet, of course, requirements for streams by the respective State Boards.

CHAIRMAN STEIN: Mr. Rogers.

MR. ROGERS: I have a question in connection with your Newnan Mill unit. This presently discharges into the Flint, which does not enter into this picture. But would any changes come about that it might discharge to the Chattahoochee?

MR. GRANBERRY: None that we can foresee. You may be acquainted with the problems of the terrain. Some of the water goes into the Chattahoochee directly. Some goes to the Flint and on down and then enters the Chattahoochee and flows into the Apalachicola. We didn't feel this was particularly germane to the discussion, but at the same time it does involve the Chattahoochee.

CHAIRMAN STEIN: Any other further comments or questions?

(No response.)

By the way, my view on this is, when an industry like yours expresses the philosophy and attitude that you have in this statement, I don't think that we are going to have any material problem with you or the State government in working out an equitable solution.

MR. GRANBERRY: Thank you.

CHAIRMAN STEIN: I really would like to commend Pepperell on this statement. Thank you very much.

MR. GRANBERRY: Thank you. We appreciate your remarks.

DR. MYERS: Mr. Chairman, --

CHAIRMAN STEIN: Yes sir?

DR. MYERS: You see now why we were complimentary of this company and of the efforts being made. We did make note of it in our regular report.

I would like to comment that there are a number of people here in the audience that are representing various consumer uses, industrial uses, and the representative of our Department of Conservation, who are legal counsel to the Vice Chairman of the Water Improvement Commission, and none of these has requested to make a special presentation. But I want to express appreciation for their being here and participating and listening to the proceedings of this conference.

CHAIRMAN STEIN: Yes. So would I. I would like to give full credit to the State. I like to hear where it stands. We want to see pollution cleaned up, and I don't want it indicated that necessarily because the Federal Government was here this is why it was being done. But I think your programs in this State are under way.

By the way, I would like to take this opportunity to make this comment. I don't think that any judgment should be made that because the Federal Government is here your pollution program in Alabama and in Georgia lags behind any of the other States. And I include all fifty. I do believe that the programs in these two States are comparable with the best program anywhere in the United States.

When I said that up in some of the Northern States, we got at least a newspaper reaction, and reaction from some of the State officials, because they couldn't imagine that you people down here were doing as good a job or perhaps better than they were up there.

But I think again this is the ironic part of water pollution control. When the States are doing a reasonably good job and we are at the verge of really cleaning up major river basins, although it might seem to be paradoxical, this is where the Federal Government comes in. I think we are at this stage now.

For years -- and I have been working at this for 20 or 25 years -- the Chattahoochee has been a river of despair and going down. I think the fact that we are here indicates that we can restore the Chattahoochee and have a clean river.

I don't think that the Federal Government, in my philosophy, could have done that alone. If it weren't for the State programs, we couldn't do it. And I don't think that the Federal function is to deal with your cities and industries on a day-to-day basis. That can always be done best by the States.

The thing we can do is possibly come to a meeting like this once in a while and outline a program and get agreement and then step back and let the States, the localities and the industries do the job themselves.

I say this to you because sometimes you don't realize it. But, again, my philosophy is, when we engage in a case, the major problem we have in the Government is disengaging as soon as we possibly can. As soon as the local people and the States get their program under way, you can expect us to disengage and just come down here for vacations. Thank you.

Dr. Myers.

DR. MYERS: Mr. Chairman, I'd like to see if Mr. John Bonham, who is legal counsel for the Department of Conservation, has a word.

Mr. Bonham, would you care to say anything?

MR. JOHN BONHAM: A very short question. Being a lawyer, I have got a pretty loud voice, so I will just read this question more or less directed to Mr. Stein.

The 1965 Alabama Water Improvement Commission Act contains what is known as a "grandfather clause" that in effect gives certain older industries and cities a possible total of seven years to finally effect their anti-pollution program and facilities. What is the position of the Federal Water Pollution Control Administration in regard to this seven-year or similar brief period?

CHAIRMAN STEIN: Well, as a fellow lawyer, Mr. Bonham, I am not sure I appreciate the question. (Laughter) I don't particularly direct this at Alabama but at any State. I would have to give you the view, and I think the steadfast view, of the Federal Government -- that we have never regarded that a statute enacted by a State was necessarily binding on the Federal Government.

In other words, we do have an obligation to clean up pollution. We do have an obligation to see that it is done in a reasonable time.

By the way, you are dealing with two States, with Georgia too, and we have to deal with this equitably.

As far as I can see, this grandfather clause does apply to this proceeding.

MR. BONHAM: Thank you, sir.

CHAIRMAN STEIN: Are there any further comments or questions?

Mr. Howard?

MR. HOWARD: I would like to say that we appreciate greatly the kind remarks you make about our program. While we are only subject to the Chattahoochee generally, I am reminded what General Walker said about impoundments. Quite frequently they provide some beneficial effect, and they really do.

Now, our Chattahoochee River has been maligned by everybody from New York on over to California. And yet we have a stream above Atlanta that has actually improved since Lake Lanier, in my opinion and in the opinion of others. So, while we have a critical problem down below Atlanta, we don't want to minimize we have a beautiful stream above Atlanta that provides trout-fishing and other water-contact sports.

I would just like to make that statement.

CHAIRMAN STEIN: May I go off the record here?

(Discussion off the record.)

CHAIRMAN STEIN: Let's go back on the record. Does that conclude the Alabama presentation?

DR. MYERS: Yes.

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